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VOLUME VII APRIL, 1914 NO. 4

Southern Medical Journal

Journal of The Southern Medical Association

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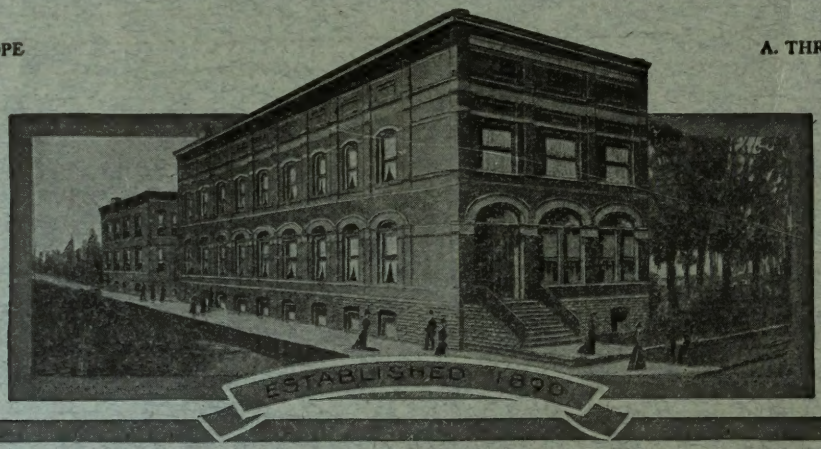

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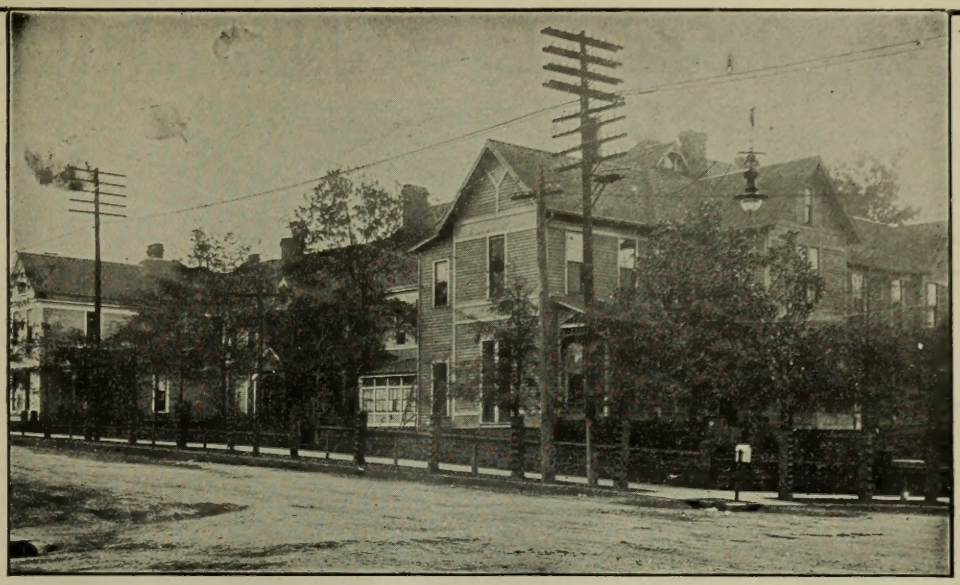

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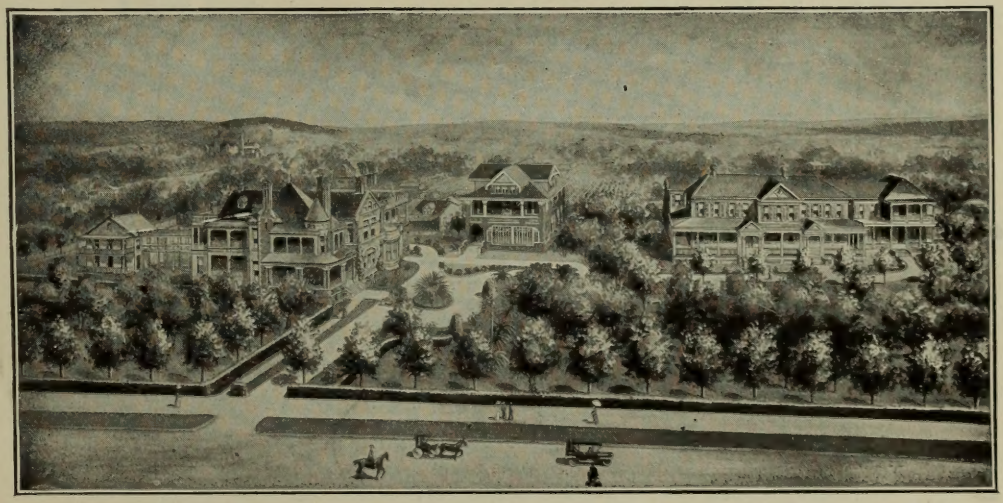

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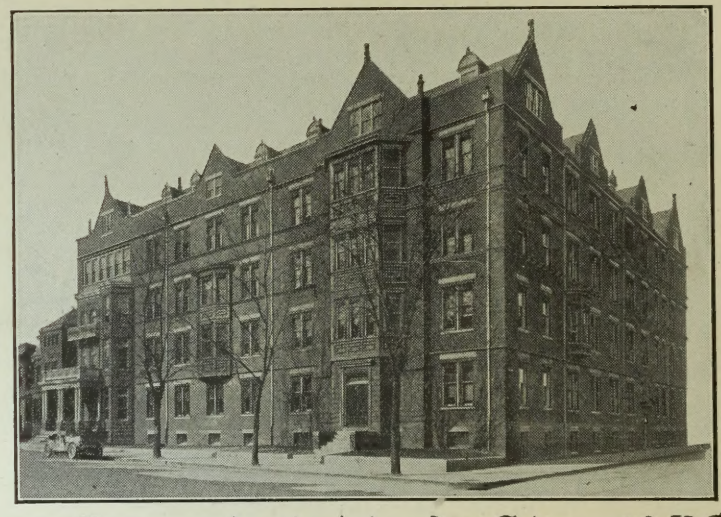

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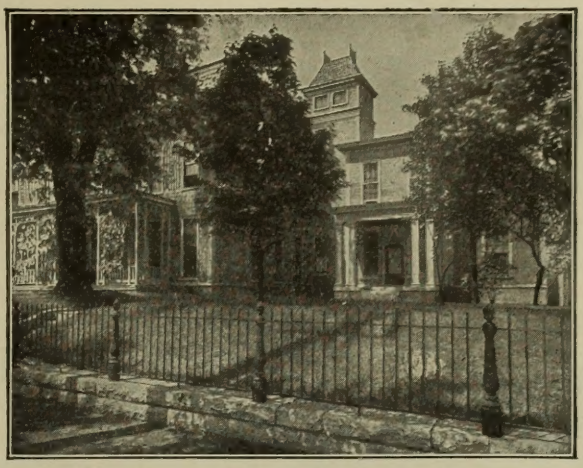

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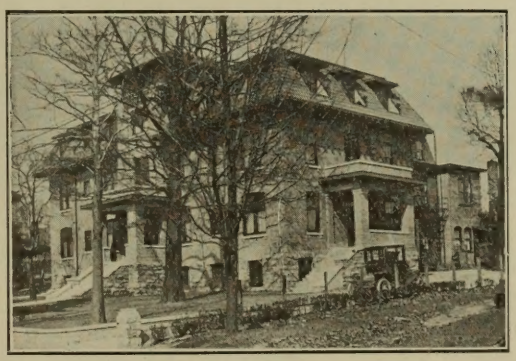

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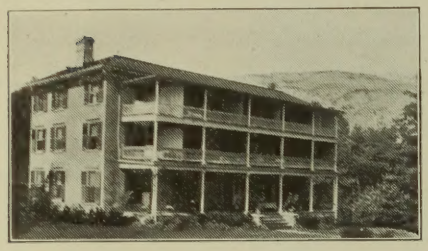

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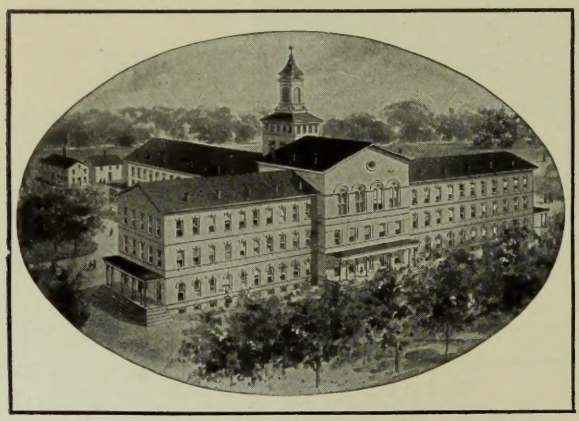

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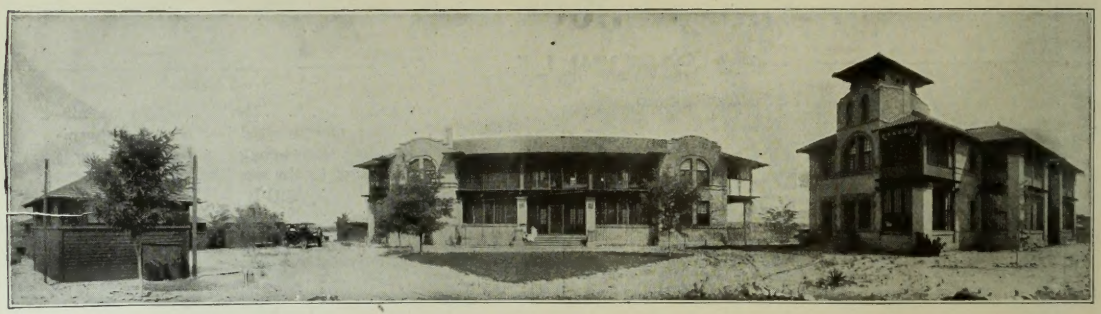

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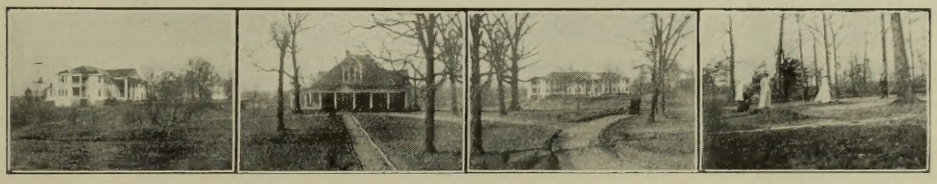

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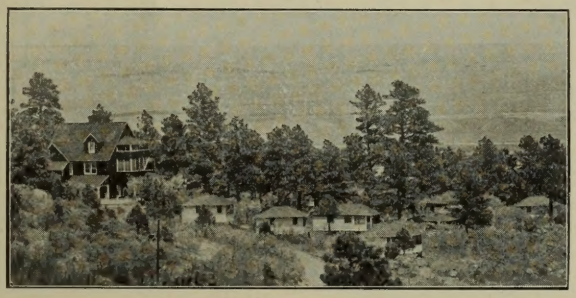

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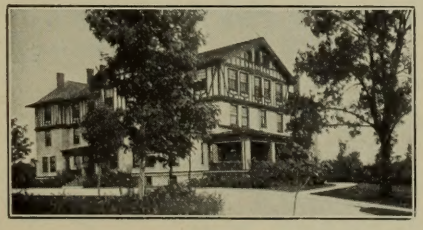

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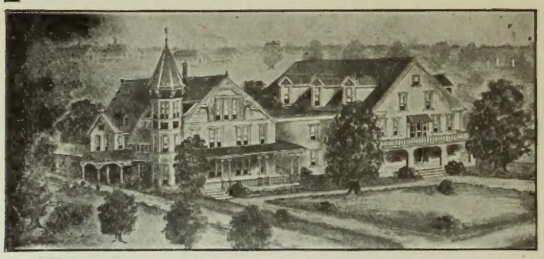

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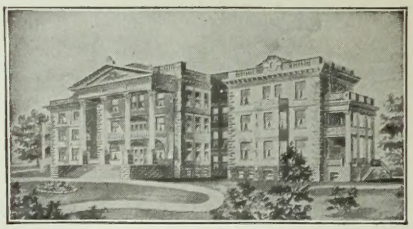

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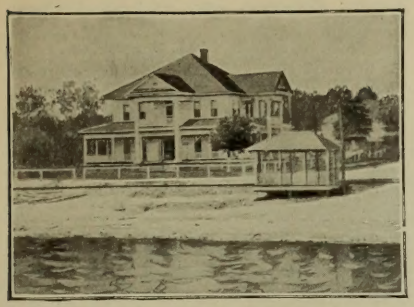

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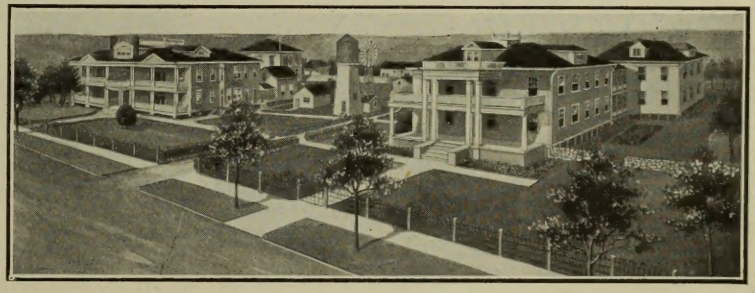

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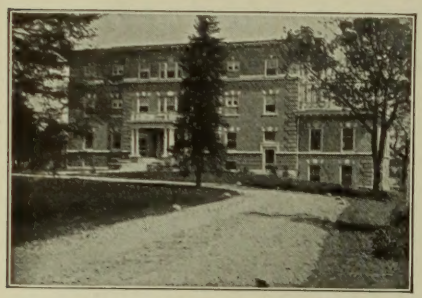

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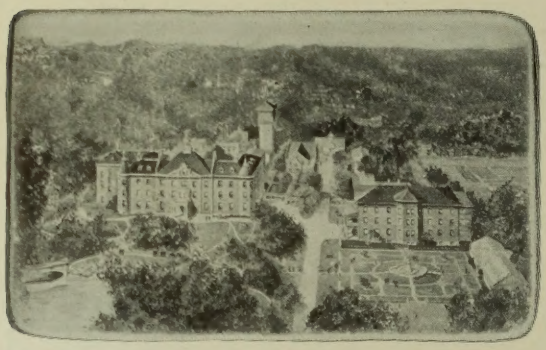

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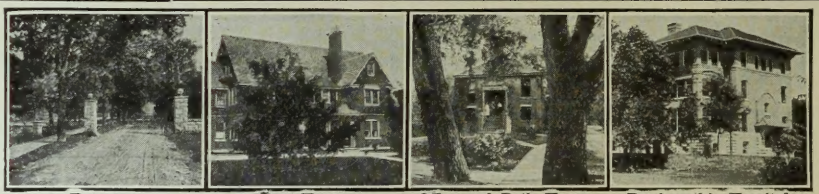

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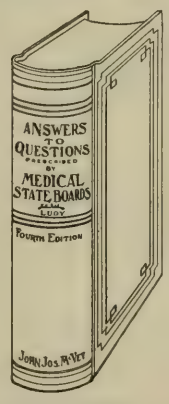

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SOUTHERN MEDICAL JOURNAL

PUBLISHED MONTHLY

Volume VII NASHVILLE, TENN., APRIL 1, 1914 Number 4

ORIGINAL ARTICLES

PATHOLOGY OF THE HEART IN RHEUMATIC INFECTION IN CHILDREN.*

By W. W. Harper, M.D.,
Selma, Ala.

English statistics show that 15 per cent of the London school children suffer from rheumatic infection, and of this number 80 per cent develop heart complications. With these facts before us, coupled with the experience of those who treat children, it becomes evident that rheumatism is a most serious and important disease of childhood. Not only because of its immediate effects, but also because it lays the foundation for future invalidism.

Last summer at the Great Ormond Street Hospital for Sick Children, London, it was my privilege to study in the post-mortem room a number of hearts from children who had died as a result of rheumatic infection. At that time I made a sketch of those hearts, and today it is my pleasure to present to you lantern slides of those drawings.

The clinical histories of these pictures were taken from the hospital records.

Case No. 1 shows a softening thrombus in the right auricle. The thrombus lay loose in the auricle and was attached by a slender

In slide No. 6 we have the heart of a boy pedicle to the tricuspid valve. This patient clinically presented the symptoms of chorea and pericarditis.

Case No. 2 was admitted to the hospital suffering with edema, hemiplegia, rheumatic nodules and cyanosis. She was 11 years old and gave a history of having had several attacks of rheumatic fever. Physical examination disclosed a double mitral murmur. At autopsy, the mitral valve was found to be thickened and distorted. Heart was enlarged. Infarcts were found in spleen, brain and kidneys.

Slide No. 3 is the same as No. 2 and shows aortic valves very much thickened and upon each valve a large vegetation.

Slide No. 4 is that from a girl 9 years old who had had chorea three years before death. She was not known to have ever had rheumatism, and was admitted to the hospital in a state of collapse from gastro-enteritis. She died soon after admission. At the autopsy large, fleshy granulations were found upon the aortic valves.

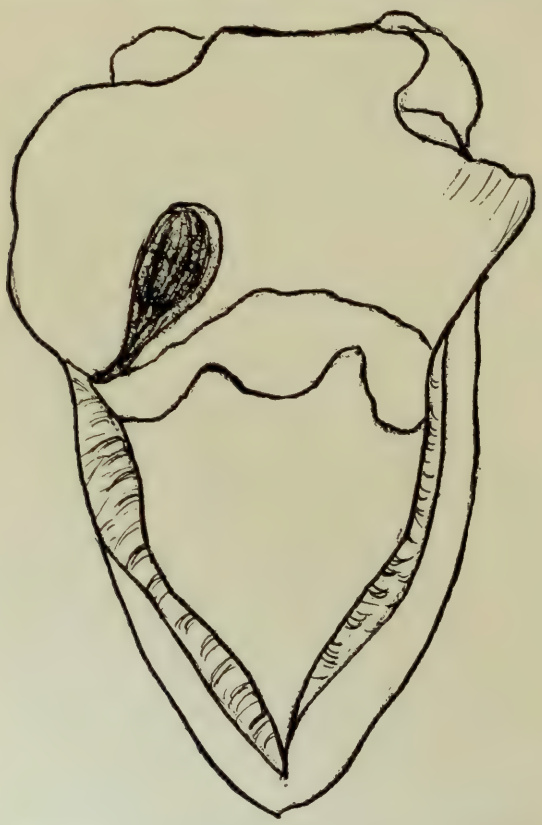
Slide No. 5 represents a heart of a 7-year-old girl who suffered from chorea. Physical examination disclosed a presystolic and systolic murmur. The mitral valve was found sclerosed and contracted. Just above the free auricular edge of the valve were seen a complete row of recent vegetations.

Case No. 7 has the following history. Boy, age 8 years. Was admitted to the hospital with apparently his first attack of chorea. There was a loud friction sound at the third left costal cartilage and a loud systolic murmur at the apex. Upon section of the heart, vegetations were found upon the mitral and aortic valves. The endocardium of the left auricle was found to be thickened and wavy. This was considered evidence of a former endocarditis.

Case No. 8 was that of a child admitted with dyspnoea and numerous rheumatic no-

*Read in Section on Medicine of the Southern Medical Association, seventh annual meeting, Lexington, Ky., November 17-20, 1913.

dules. She gave a history of having been sick one year. The apex beat was found in the sixth intercostal space, ¾ inch outside of the nipple line. Well marked presystolic thrill at apex, and presystolic and systolic murmur. Patient suffered intense headache some days before death. Autopsy showed mitral valve so narrow that it would not admit the tip of the little finger and appeared as a small round hole in the valve. The slide represents a transverse section at the auriculoventricular juncture. The smaller opening is the contracted mitral opening, and the other opening is the normal tricuspid orifice.



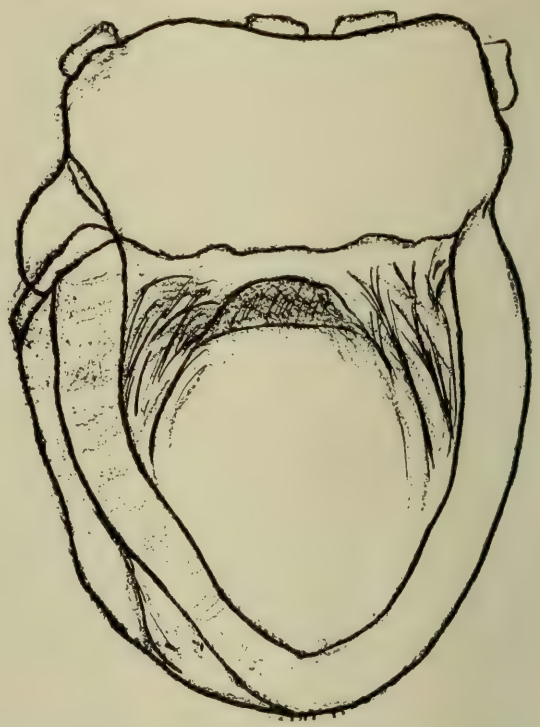
Rheumatic pericarditis and chorea. Softening thrombus in right auricle.

Case 9 is that of a girl 10 years of age who died after ten days' illness from a first attack of chorea. Autopsy showed a very marked thickening of the mitral valve, the result of rheumatic endocarditis.

A study of these slides demonstrates:

1. That in children endocarditis is often the only symptom of rheumatism.

2. That chorea is the result of a rheumatic infection and that every child suffering from acute chorea should be placed in bed and kept there until the acute symptoms have subsided.



Patient eleven years. Had several attacks of rheumatic fever. No chorea. On admission there was cyanosis, oedema, hemiplegia, nodules and double mitral murmur. Mitral valve thickened and distorted. Heart enlarged. Infarcts in spleen, brain, kidneys.

3. That a primary attack of rheumatic endocarditis is not ulcerative.

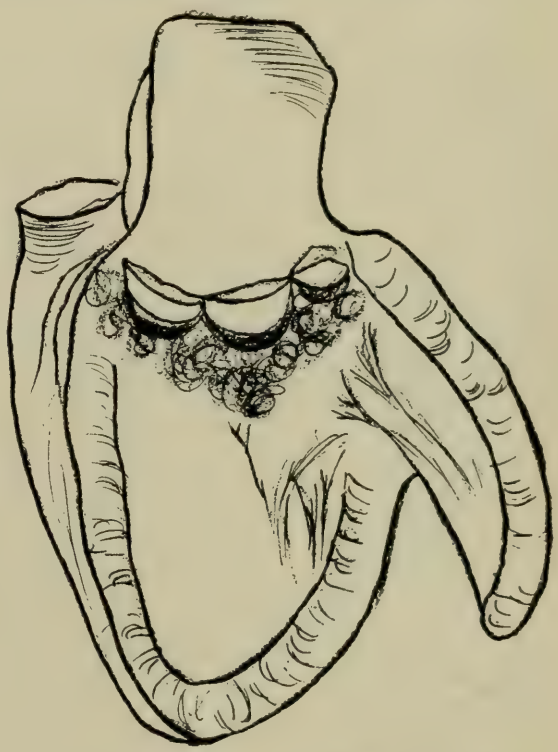
4. That a first attack of rheumatic endocarditis usually leaves the heart valves in such a condition that vegetations frequently develop during a second attack of rheumatism.

5. That such valves are peculiarly vulnerable should the patient be subsequently attacked by any of the pus-producing bacteria, such as the pneumococcus, streptococcus or colon bacillus.

DISCUSSION.

Dr. McGuire Newton, Richmond, Va.—In the consideration of rheumatism in early life, we should constantly bear in mind the fact that its manifestations at this time are quite different from those in older persons. Conspicuous among these differences is the absence of joint involvement, consequently the articular symptoms in young children which are attributed to rheumatism are more frequently than otherwise due to other conditions such as scurvy, osteo-myelitis, epiphysitis or septic arthritis. Another difference of importance is the absence of pain or other symptoms referable to the throat in young children who are affected with rheumatic tonsilitis, with the result that rheumatism is frequently overlooked in this class of patients, owing to the failure to make routine examinations of the throat.

Clinical history the same as two. The cusps of aortic valves thickened and have upon them large vegetations.

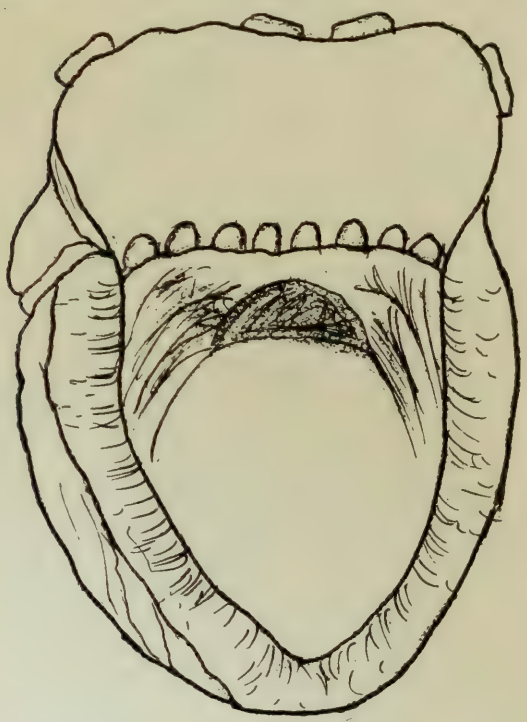


Girl, nine years old. Had had chorea three years before death. Was not known to have had rheumatism and was admitted to hospital in collapse from gastro-enteritis and died soon afterwards. No murmur audible. Autopsy showed large, fleshy granulations upon aortic valve.

Dr. Phillip F. Barbour, of Louisville.—It is important to emphasize that children do have rheumatism in a severe form with involvement of the heart. The proportion of bed patients at the Great Ormond Street Hospital, London, suffering from rheumatism is twenty-five per cent, and is a good deal larger than the percentage of rheumatism that obtains in this country. As to what is the exact cause in London is hard to say, unless it is a combination of dampness, dirt and darkness, which seem to work well together there. One point which Dr. Lees used to bring out in his demonstrations was that endocarditis followed myocarditis, and in his experience it was always possible to foretell that endocarditis was coming by examining the heart for myocarditis. An enlargement of the area of deep cardiac dullness always preceded the development of endocarditis. We believe that the relation of tonsilitis, acute or chronic rheumatism is a close one. I should like to have heard more regarding the relationship of common growing pains of children to rheumatism. I am sure growing pains are overlooked in a number of cases by physicians, and these are warning signals of the development of rheumatism in children. I have often heard children complain to their mother that the toe or leg hurt at night, and have followed these cases to subsequent rheumatism. I think it is important that when a child complains of a pain in any limb in retiring at night, that that child should be watched for the development of rheumatic manifestations. That is the time to take the child and cure the rheumatism before it develops damage to the heart. Endocarditis, tonsilitis, growing pains and chorea in children will be followed in almost every case by endocarditis, if not properly treated. It is a misfortune we have not heard the other papers, which would have cleared up some of the other things in rela-

tion to rheumatism and emphasize the importance of this disease in childhood.

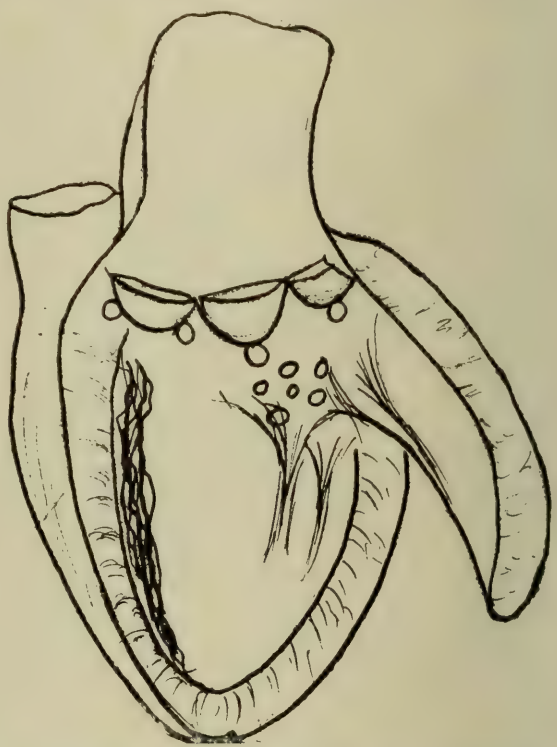
Dr. Samuel E. Woody, Louisville.—In these days of startling laboratory successes; of practical tests, as for tuberculosis and typhoid, and of bacteriological tests innumerable, it is a matter of great regret that in the diagnosis of rheumatism we are still stumbling along in the dark as our fathers did, and whether suspecting the disease or not, unable for days to confirm or refute the suspicion. Especially is this regret felt by the pediatrician as he realizes again and again how insidiously rheumatism can creep upon him. Though rheumatism is more frequent and serious in children than in adults, it is more difficult to recognize and much oftener overlooked. Time and again I have found myself treating a child



Girl, seven years. Had chorea. Clinically, there was a presystolic and systolic murmur. At autopsy the mitral valve was found sclerosed and contracted. Just above the free auricular edge of valve was seen a complete row of recent vegetations.

for something else because I did not heed the hint of growing pains, muscular soreness, etc., and had failed to listen to the heart for incipient endocarditis. In a case with growing pains, muscular pains, and especially tonsilitis, it is good practice to give the little patient the benefit of the doubt by sending it to bed and applying the therapeutic test of full doses of salicylates and iodides. It is my rule to give these on even a robust suspicion of rheumatism, especially now that we have at our command compounds of salicylic acid and of iodine, such as diplosal and iodalbin, that are tasteless and unirritating with no loss of potency. These, being insoluble in the saliva and the acid gastric juice, do not offend the palate or the stomach, and dissolve only in the alkaline intestinal secretions, and there so gradually as to cause no appreciable intestinal irritation.

Dr. C. C. McLean, Birmingham, Ala.—I would like to report briefly several cases of acute rheumatic fever, and complications following acute rheumatic fever, in which blood cultures were made. These cases were included in a paper read before the Jefferson County Medical Society some three months ago. There were three cases of acute rheumatic fever included in the series. One case gave a history of having repeated attacks of rheumatism, and was not so acutely ill as the other two cases. Patient had a slight endocardial



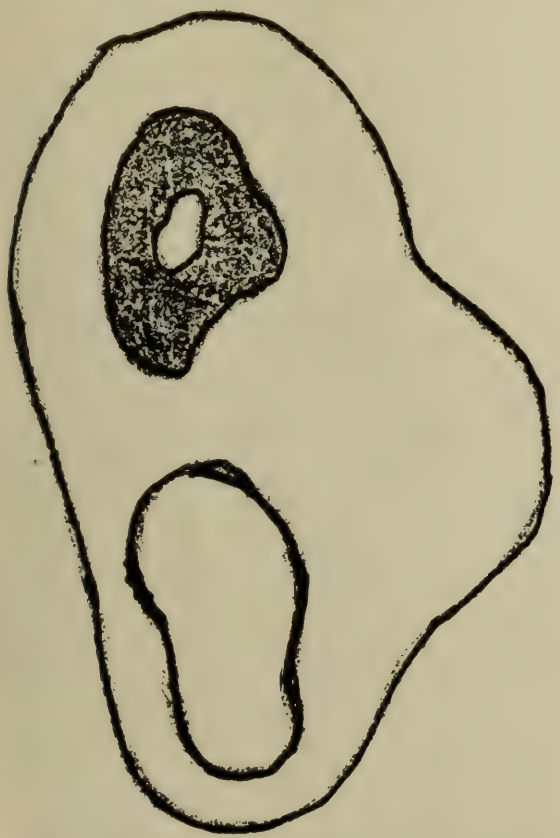
Clinical history. Boy, aged eight years. Admitted with first attack of chorea. There was a loud friction sound at the third costal left cartilage, and a loud systolic murmur at the apex. There are vegetations along the mitral and aortic valves. The endocardium of left auricle was thickened and wavy, which was considered evidence of former endocarditis.

murmur, and scattered over body were several rheumatic nodules; some of the joints were swollen, red, inflamed and a little tender. Repeated blood cultures on this case were sterile.

The other two cases were extremely interesting, as they occurred in brother and sister. Both of these cases gave histories of having had no previous attacks of rheumatic fever. The brother, on admission to hospital, was acutely ill—temperature 104; several joints were red, inflamed and

exceedingly tender. Blood culture was made on the fourth day of illness, and a diplococcus in long chains was found.

The colonies did not hemolyze blood plates, and had a distinct green appearance. We were undecided as to whether it was the diplococcus of rheumatism, or the streptococcus viridans (green streptococcus). The culture was given to the New York Board of Health to differentiate, and the report came back that it was the streptococcus viridans. A similar organism was found in the blood of the sister. These cases were acutely



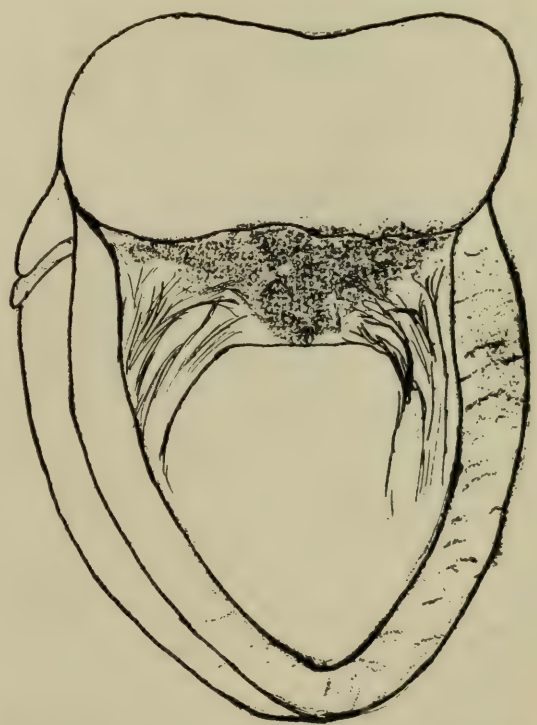
Child; was admitted with dyspnoea and numerous rheumatic nodules after an illness of one year. The apex beat was in the sixth interspace, three-quarters of an inch outside the nipple line. Well marked presystolic thrill at apex. Presystolic and systolic murmurs. Intense headache some days before death. The mitral valve was so narrowed that it would not admit the tip of the little finger and appeared as a small, round hole in the valve.

ill for two weeks, and left the hospital in an apparently normal condition. There were five cases of chorea in the series.

None were running a temperature. Four had a slight endocardial murmur, and all gave histories of either having repeated attacks of rheumatism, or growing pains. Blood cultures were sterile in each of these cases.

There were seven cases of acute pericarditis with accompanying endocardial murmurs, and all gave a history of having had repeated attacks of rheumatic fever. These cases were acutely ill, all running an irregular temperature, but strange to say the temperature was rather low, usually ranging between 99 and 101 degrees; 103 was the highest point reached in any of the cases. Three of these cases gave positive blood cultures, and in each of these cases was a distinct friction rub obtained at some time during the illness. This was true in but one of the negative cases. This case died, and at autopsy vegetative growths were found on mitral and aortic valves. There was a fibrinous exudate in the pericardial sac, and in the heart muscle was a small abscess containing about two c.c of pus. Cultures made from pericardial exudate, valves, and pus contained in abscess, showed streptococcus viridans.

The organisms found in the blood of the other



Girl, aged ten years. First attack of chorea, which proved fatal in ten days. Autopsy showed marked thickening of the mitral valve from endocarditis.

three cases proved to be the streptococcus viridans.

I am inclined to think that the danger of rheumatic infection through the tonsil is exaggerated, and too little importance is given the teeth. As a rule the first attack of rheumatic fever occurs in children between the ages of six and twelve years, and any one who examines the teeth of these children with rheumatic fever will be impressed by the fact that almost invariably the teeth are in bad condition.

In conclusion I will state the reason we think

more positive blood cultures are not obtained in rheumatic fever, and in pericardial and endocardial cases, is due to the fact that cultures are not made in the first attack, or are not made in the acute stages.

Dr. L. W. Elias, Asheville, N. C.—This is a very important subject. We have ample demonstration this afternoon of the seriousness of rheumatism in its damaging effect upon the heart; and the facts shown emphasize the importance of taking more care in examining children. There is enough guess work to which we are obliged to resort in the practice of medicine, without neglecting the helps that lie at hand. No one has the right to prescribe for a child without first examining at least the throat, the chest and the abdomen. These ought to precede every treatment. If we make this a rule we will detect most cases of rheumatism, because, as one of the speakers has just said, the teeth and the tonsils are the usual portals of entry for the rheumatic infection. If diseased they will suggest the possibility of rheumatism. When we come to an examination of the chest we will not overlook the damaged heart, and will probably trace this to its proper source.

Another point that we should emphasize is the history. Every child that gives a nervous history should be supected of rheumatism as its probable cause, and other symptoms should be carefully searched for.

As to the treatment of rheumatism, the American Medical Association sent out different ones of the usual forms of salicylic acid. These were designated only as A, B, C, D, and Dr. Gillman Thompson told me that they tried these out at Bellevue Hospital, and they all gave practically the same results. Therefore we may follow our own preferences in the matter of treatment, and expect the same results as others, so far as the medicine is concerned. For the treatment of children most men prefer aspirin, supplemented by alkaline treatment, and, above all, by rest.

Dr. B. H. Booth, Drew, Miss.—There is one point I would like to bring out in connection with this discussion, which has not been mentioned. We have quite a number of cases of rheumatism which present clinical symptoms, and the general acceptance is that it is rheumatism, but we do not know whether it is a disease per se or the result of some disease. That we do not understand. We see something is wrong with the tonsils, we get symptoms, and we diagnose rheumatism, but we do not know whether that is a disease per se, or whether it is the result of the tonsillar infection. In the same way we may have these symptoms from an attack of malaria, and we may make a diagnosis of malarial rheumatism. These patients present all the clinical symptoms of any of the forms of malaria, either the acute or chronic, with articular rheumatism. You may examine the tonsils and you will find no cause for it; you may make a microscopic examination of the blood and find the plasmodium or not. You go to work and give positive malarial treatment, and you will find immediately that the rheumatism will abate, and you will soon have it cured. As long as we have no specific cause for rheumatism, and we do not know what it is, it behooves us here to, at least, before we go to treating these cases to eliminate malaria from our diagnosis as the cause of the rheumatism. If we cannot eliminate it from the diagnosis treat the malaria.

Dr. J. D. Trawick, Louisville.—Since this discussion is more or less general, and is not being confined to the particular subject of the paper, I may be pardoned if I throw in a surgical suggestion in order that we may get the benefit of a view of the whole subject.

The differential diagnosis between rheumatism in children and osteomyelitis is technically an easy thing, and yet the mistake is being made every week of confusing osteomyelitis with rheumatism. The continuation of pain in a joint or joints is being considered rheumatic until the golden opportunity is lost surgically, and it is found that the child has been actually suffering from osteomyelitis. I simply want to remind the gentlemen that osteomyelitis is an exceedingly common affection in children, and should not be overlooked in considering rheumatism.

Dr. James D. Love, Jacksonville, Fla.—I would like to take exception to the statement made by Dr. Booth, that we do not know the cause of rheumatism. I believe we do. The investigations of Drs. Poynton and Payne in London have proven conclusively to my mind at least that they have discovered and isolated a diplococcus that is the causative factor of rheumatism. This organism is called the diplococcus rheumaticus, and it has, according to my way of thinking, fulfilled all of Koch's postulates. We find this diplococcus wherever there is a reasonable chance to find it. We find it in local lesions. It can be isolated, and experimentally cases of rheumatism can be produced in other animals with this diplococcus, producing the clinical and pathological evidences of rheumatism. And, finally, the diplococcus can be recovered from the second animal. Why the work of Poynton and Payne has not received more universal acceptance I am unable to say. I am gratified to know, however, that it is being gradually accorded recognition throughout the scientific world. I wish to call attention to a great many diseases that may owe their existence to rheumatism—broncho?pneumonia, pleurisy, peritonitis, and often a renal rheumatism. I merely mention these diseases to show that rheumatism is very destructive in its workings, and very insidious also. It is difficult, I will admit, to determine when rheumatism is an etiological factor in these diseases, because we cannot find the diplococcus in the blood, and we cannot find it in the more superficial local lesions, but it is, I am confident, a disease that causes very much more trouble than a great many practitioners believe, and is responsible for many more illnesses than we generally believe at present.

Dr. W. W. Harper, Selma, Ala.—I regret very much that the other essayists on the program are absent. A young man having made a failure in various phases of medical life, finally confided to some of his friends that he was going to be a child specialist, and they asked him why. He replyed, "Simply because a child is nothing but intestines and lungs, and I am sure I can master the diseases of those two organs." ?(Laughter.)

But, gentlemen, if we should examine the throat and heart of every child we are called to see, we are going to make many diagnoses and find many surprises. The gentleman from Louisville (Dr. Trawick) spoke of osteomyelitis, and that we should try to avoid making the mistake of diagnosing osteomyelitis for rheumatism. If we do, we are likely to have a funeral. Osteomyelitis is one of the most serious diseases a child can have, and often the only symptom of osteomyelitis is a high temperature. Osteomyelitis is a disease of the bone breaking through into the periosteum. It is a disease that affects the diaphysis of the bone. Rheumatism on the other hand affects the synovial membrane of the joint or the fibrous tissue surrounding the joint. If you have inflammation of the joints above the epiphyseal line you know you have probably a rheumatic infection, and not an osteomyelitis; whereas, if this lesion is below the epiphyseal line, you know you are not dealing with a case of rheumatism, generally speaking.

Leaving out cancer, there is probably no disease which is more dependent upon heredity than rheumatism. Heredity seems to prepare the soil, so that when the diplococcus rheumaticus, as has been pointed out by Dr. Love, enters or gets into the soil you have a case of rheumatism. The tonsils are probably the greatest avenue for infection, and the chances are that 75 per cent of all cases of rheumatism are infected through the tonsils. Next to the tonsils, is the nose, and after the nose, diseased teeth.

There is one point I should like to call attention to, and probably will be the means of steering you clear of a great many pitfalls and enable you to make a diagnosis of rheumatism. Remember this, that rheumatism is extremely rare under the age of three years, and practically never occurs under the age of two years. When called to see a child suffering from a joint trouble under two years of age, rule out rheumatism. When you have a joint inflammation in a baby under six months of age, there is only one condition, leaving out trauma, and that is syphilitic epiphysitis. If you are called to see a child with inflammation of the joints under six months or under one year, you can be absolutely sure of your diagnosis of syphilitic epiphysitis. In a child suffering from joint trouble or growing pains, or pain when it is handled, particularly between the first and second year, there are two diseases you must think of, namely, scurvy and rickets. These diseases occur between the first and second year; between the second and third year you can reasonably suspect tuberculosis. Bearing in mind these few practical points, you will not have very much trouble in making the differential diagnosis.

SYMPTOMS OF RHEUMATISM IN CHILDHOOD.*

By H. P. Dawson, B.S., M.D.,
Pediatrist to St. Margaret's Hospital,
Montgomery, Ala.

Rheumatism is one of the many diseases which illustrate the considerable differences which may exist between the manifestations of one and the same disease—when it occurs in an adult and when it occurs in a child. Rheumatic inflammation of the fibrous tissues is a common affection in early life. In childhood, indeed, there appears to be a peculiar tendency to rheumatism, and in children the disease may assume many different phases.

The conception of rheumatism as essentially a joint disease is based on its occurrence in adolescent and adult life; the wider and almost certainly more accurate conception of rheumatism as a general disease, probably of infective origin, is based chiefly on its manifestations in childhood.

In a child the articular phenomena of rheumatism become a matter of merely secondary importance; indeed, judging from clinical evidence, one would say that a child may suffer severely from rheumatism who has never had a pain in its joints in its life.

As is well known, the joint symptoms in a child are often so slight that the parents take no notice of them, beyond dismissing them from their memory with the comforting assurance that they are "only growing pains," so that even with careful inquiry it is often difficult to be quite certain that some such transient aches or pains may not have occurred at some previous date and have since been forgotten. Allowing, however, for such a fallacy, one sees cases of undoubted rheumatism in childhood in which joint phenomena would seem to be entirely absent.

The symptoms of rheumatism in childhood differ from those in adults chiefly in the much

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slighter character of the joint manifestations, and in the much greater prominence and frequency of the heart affections.

Reference has been made above to "pains in the limbs" as evidence of rheumatism in children, and clinical experience shows that pains referred to the limbs, as distinguished from the joints, may be just as significant of rheumatism in children as swollen, red and tender joints. This is proved by the fact that it is quite common for children with only such vague "pains in the limbs," for example, in the calf or thigh, to show other symptoms of "acute rheumatism," such as endocarditis and pericarditis or subcutaneous nodules; moreover, definite swelling and tenderness of the joints may immediately precede or follow these pains in the limbs. The practical importance of recognizing the significance of these slight pains in the limbs in chldren—"growing pains" as they are too often called—can hardly be overrated.

In connection with the joint symptom I may mention that Sir Thomas Barlow has called attention to the frequency of affection of the hip joint in the rheumatism of childhood. Rheumatism, in some instances, remains limited to one joint for several days, and when it affects the hip joint may easily suggest commencing tuberculous disease, or may lead to stranger errors owing to the very indefinite localization of pain in children. About one year ago I was called in consultation to see a supposed case of intussusception, which a few days later was followed by definite symptoms of rheumatism elsewhere.

Another symptom which is of importance because it may be the earliest manifestations of rheumatism in a child is stiff neck. This may seem a trivial affection, but, like the vague pains and stiffness in the limbs, it may be followed or accompanied by severe cardiac rheumatism.

The frequency of cardiac affections is one of the most characteristic features of rheumatism in childhood. Sir George Still reports, in 170 as far as possible consecutive cases with rheumatic manifestations, 128 had cardiac bruits, which in 93 cases were certainly due to endocarditis.

But endocarditis and pericarditis are by no means the only results of cardiac rheumatism, and in children, probably to a greater extent than in adults, cardiac dilatation is a frequent result of rheumatism, an important point to which Dr. Lees has specially drawn attention.

It may not be out of place to mention here the wasting which so often accompanies cardiac rheumatism in childhood. I have had two cases brought to me with this only complaint, the mother not suspecting rheumatism or cardiac disease. However, on inquiry there was a history of vague pains in the limbs for many months past.

In England great stress is laid upon the rheumatic nodule as a manifestation of rheumatism in children. These nodules are to be found most often over the olecranon process and the condyles of the humerus and femur, and occasionally over the spinous processes of the vertebrae, the malleoli, the ends of the radius and ulna, the knuckles and other bony prominences.

The appearance of these subcutaneous fibroid nodules appear to be scarce in our cases in America. It has been my privilege to see one case, this being complicated with endocarditis, pericarditis, pleurisy and chorea. These nodules may occur also with chorea without other clinical evidence of rheumatism, a point which is worthy of note in considering the relation of chorea to rheumatism. The above patient has been under observation for two years and at present is in good health except for a systolic bruit.

Amongst the symptoms of rheumatism in children, as in adults, must be reckoned sore throat. Tonsillitis so frequently occurs just before the onset of rheumatic pains in children that it is difficult to escape the conclusion that it bears some direct relation, possibly as medium of infection, to rheumatism; its occur-

rence also is sometimes followed by an exacerbation of rheumatism.

There are certain minor symptoms, which, although not usually described as symptoms of rheumatism, seem to have a very close connection therewith, for example, "pain in the stomach," which is usually referred to the epigastrium. Another symptom which I have noticed is pain in the side, usually in the lower part of one axilla. A common trouble in rheumatic children, and in the children of rheumatic parents, is headache. The rheumatic child is *par excellence* the nervous child.

The frequency of rheumatism is also seen in association with "night terror," somnambulism, habit spasm and lienteric diarrhoea.

There is one further phenomenon which is noteworthy in rheumatic children, and which is perhaps worth mentioning here, the association of red hair with rheumatism and rheumatic heredity.

The importance of early recognition of rheumatism in children will be realized by those who are familiar with the frequency of heart disease in the rheumatic child. I suppose there are few more pitiful conditions than that of the child dying with cardiac rheumatism, and it is by paying attention to "the day of small things," the apparently trivial aches and pains, and the various associations which make up the picture of rheumatism in childhood, that we may hope, in some cases at least, to prevent those terrible results which are too often seen from neglected rheumatism in children.

SOME OBSERVATIONS OF MUMPS. WITH DISCUSSION OF COMPLICATIONS.*

By J. S. Turberville, M.D.,
Century, Fla.

This contagious and infectious disease, no doubt as old as man himself, certainly known since the era of Hypocrates, is usually regarded as a joke by both physicians and laymen. It generally takes a complication to change the smile.

It has been my fortune, or misfortune, to see some rather severe cases of this disease, therefore I am not one of the mockers. On the other hand, I consider it a rather serious disease.

During my medical experience I have seen a number of cases out of the ordinary, mostly as regards complications. In 1908 a ferryman came down with a fully developed case of the mumps from which he had convulsions during a testicular complication. This man averred that he had seen no one with the disease. However, in the course of my interview mention was made of the possibility of contagion from drinking and eating utensils. He asked "if a man could take mumps from another before his jaws swelled?" From this question it was found that the patient had drunk whisky from the bottle of another who came down with the mumps a few days later, and that here was the source of the infection. This taught me that you can contract mumps from people who have no evidence of the disease.

There is a popular notion among medical authorities that mumps does not attack very old people. Every country doctor knows that this is an error. In epidemics of mumps one frequently sees a member of an infected family who apparently does not have the disease, certainly not provable. One will also find that some of these individuals have had fevers of an indefinite nature during the epidemic. Can it not be that there is an atypical mumps, the same as in other diseases? Hypothecating the truth of this, will it not account for the absence of the disease in some old people? The basis for the truth of the hypothetical fact is that in epidemics in isolated territory practically everybody has the disease except infants.

In 1911 a case came under my observation which, including complications, lasted nearly

*Read in Section on Medicine, Southern Medical Association, seventh annual meeting, Lexington, Ky., November 17-20, 1913.

four weeks. There was nothing unusual except the duration and the severity of the illness.

In the early part of this year there was an epidemic of the most severe type that it has been my privilege to observe. One patient in April had at the end of a week an orchitis, at the end of another week severe distress over the entire hepatic area with a recrudescence of fever. After the subsidence of this he was again attacked with pain in his abdomen, but this time lower down in the region of the pancreas. There is no doubt in my mind that the two latter complications were, first, a hepatitis, and, second, a pancreatitis. All during the epidemic abdominal pain and distress were prominent symptoms, but not of such definite nature as to be positive of pancreatic involvement. However, this is highly probable. H. W. Jacob, *Brit. Med. Journal*, June 23, 1900, reports a case of acute pancreatitis in a boy of 10 years. My case was in a man of about 50. I believe with more careful observation that acute pancreatitis will be found third in point of frequency of complications. The first place will be held by the testicle, the second by the submaxillary and sublingual glands, and the third by the pancreas.

In going into the history of indefinite abdominal conditions, will it not be well to consider mumps as a possible source of the trouble? Is it not possible that some cases of chronic pancreatitis have their origin in attacks of mumps instead of cholecystitis consequent upon typhoid fever? We know that the majority of chronic pancreatic troubles result from typhoid cholecystitis, but there are a small number that mumps may play a part in their causation.

In March of this year I saw a negro man relapse, in whom with a recurrence of his parotiditis, the lymph nodes all over his body were very much enlarged, some being as large as a hen's egg. This lymphatic enlargement, in a less degree, is present now. However, three months ago he contracted a genital sore which was very suggestive of chancre; therefore, it is impossible to say whether the enlargements now present are those arising with the mumps complications, or are a manifestation of syphilis.

Various complications, such as endopericarditis, arthritis, pneumonia, nephritis, thyroiditis, etc., are mentioned by various authors.

What does it show? To me it shows that mumps is a rather serious disease, at times attacking various organs in a more or less serious degree, and with the possibility of lasting and troublesome sequelae. It is our duty to inform ourselves and educate laymen in the possibility of remote and dangerous effects from any disease, however mild. Mumps is no exception, and should have the same care exercised in its management as in other febrile diseases. Were this done in all cases complications would become less and perhaps sequelae unknown.

Gentlemen, in this rather rambling talk if I have impressed any one present with the possible seriousness of mumps who was wont to regard it as a joke, I shall have no apology for taking your time.

DISCUSSION.

Dr. G. C. Kilpatrick, Pensacola, Fla.—I think the disposition of every one upon hearing such a paper as Dr. Turberville has just read is one of appreciation. Not because of any startling findings submitted, however, but rather as an acknowledgment of his effort to arouse the inertia of the thinking man regarding a disease as perfectly described by Hypocrates, Galen, Celous and Mangor as by Chalmers, of South Carolina, in 1744, and our great auditors of medical knowledge of today.

It is evident, therefore, that this disease has not been properly studied, no doubt because it bears little respect both from the physician as well as layman. Death is not the rule with mumps, and the consequent lack of post-motem material naturally acts as a barrier to the investigator. Notwithstanding this, however, the clinician has, sooner or later, an opportunity to see the complications of this disease, and as they, rather than the disease per se, constitute the greater pathology, observations regarding them, especially that made by the doctor with reference to pancreatitis, are pregnant with the potentiality of progress.

COCAINE AS A RESPIRATORY STIMULANT.*

By Geo. E. Pettey, M.D.,
Memphis, Tenn.
Author of "Narcotic Drug Diseases and Allied Ailments," etc.

The fact that cocaine is a respiratory stimulant has been known for ages, but there is nothing in medical literature, so far as the author has seen, that would lead one to conclude that it is the most prompt and efficient of all respiratory stimulants; in fact, that it is the one remedy which has the power to restore respiration when other remedies seem powerless to do so. The author's rather extended experience with the remedy leads him to believe that such a conclusion is justifiable. To show, in part, the ground the author has for such a conclusion two cases will be reported in detail:

Case No. 1. J. J. T., alcoholism, with threatened respiratory failure. Patient admitted June, 1912. Had been in semi-comatose condition for a couple of days, following alcoholic delirium. Bowels had not moved for several days and system was extremely toxic. Pulse 110 and of small volume. Arterial tension very low; respiration 6 to 10 per minute and irregular.

The writer was not at sanitarium at the time of admission and those in charge attempted to stimulate respiration with adrenalin, strychnin and caffein, but full doses of these drugs made no perceptible impression on the character or rate of respiration. If continuous efforts were made to arouse him he would breathe eight to ten times per minute, but if left to himself the respiration would fall to from five to eight per minute for a short time, and then there would be a period during which he would breathe about ten times per minute. The restoratives above mentioned, together with saline solution, were freely administered for several hours without effecting any material improvement in the condition of the patient. At this time the writer saw the case and at once administered ½ gr. cocaine hypodermically. Within ten minutes slight improvement in character of respiration was noted. One-half hour later another ½ gr. cocaine was given, and this was followed by almost immediate improvement in respiration, and ten minutes from the time of giving the second ½ gr. dose, the patient was breathing twelve times per minute, and more regularly. This improvement was maintained without perceptible variation for one and one-half hours, when breathing again began to be irregular and less frequent. Two hours from the time of giving the second dose of cocaine, respiration was eight to nine per minute and somewhat irregular. At this time ¾ gr. cocaine was given and within five minutes the irregularity disappeared and the rate was restored to twelve per minute. This improvement held without perceptible change for one and three-quarters hours, but in the fifteen minutes following that time, both irregularity and reduced frequency of respiration again occurred. One grain of cocaine was then given with almost immediate improvement. The respiration became regular and from twelve to fourteen per minute. This improvement continued for two and one-half hours, and then began to show both irregularity and decrease in frequency. Three hours from time of giving last dose of cocaine, respiration was eight to nine per minute and irregular. One grain was again given with prompt restoration improvement. This improved condition continued without perceptible change for two hours, but during the next hour both irregularity and decrease in depth and frequency of respiration occurred, and the patient's condition, so far as respiration was concerned, was practically what it had been when the effect of the remedy had waned three hours before.

*Read in Section on Medicine of Southern Medical Association, Seventh Annual Meeting, Lexington, Ky., Nov. 17-20, 1913.

One grain of cocaine was again given with prompt restoration of a more favorable condition, and this improvement was held almost exactly two hours, when respiration again began to be irregular. The patient was watched and the dose withheld until the end of the fourth hour from the time of administering the last dose. At this time the respiration was nine per minute and irreguar. One grain of cocaine was then given and ten minutes later respiration was twelve to fourteen per minute. Following this, one grain of cocaine was given every three hours for the next twenty-four hours, during which time free elimination by bowels and kidneys was obtained, and it was then found that one grain given every four hours maintained fairly normal respiration, but if withheld longer than that, respiration became unsatisfactory. As the system was more fully freed from toxic matter, the time between doses was lengthened to five hours, and then to six hours, and later discontinued. Altogether, the drug was given five days in this case, principally in doses of one grain, repeated at intervals of three hours, and while efforts were made to substitute other respiratory stimulants for it, none of those which were tried seemed in any way to take its place or to improve the condition of the patient.

The threatened respiratory failure in this case was evidently due to the toxic condition of the system, for as this toxic condition was overcome, normal respiration resulted, but in the meantime, cocaine served most happily, and was the only remedy which seemed to have direct effect upon the respiratory function.

Case No. 2. B. S. J., paraldehyde poisoning. Patient admitted June, 1913. Had taken Keely treatment for morphinism one month previous to admission, and to overcome the persistent insomnia which followed that treatment (gradual reduction), after trying a number of hypnotics to no avail, had begun to take paraldehyde. For about two weeks he had been taking two ½ oz. doses of paraldehyde daily Patient said that from the time of beginning the use of paraldehyde one dose of this size was not sufficient to induce sleep, but by taking a second dose, two or three hours later, he secured a full night's sleep. For several days preceding admission patient had been showing signs of intoxication from it. Instead of inducing sleep, patient was rendered wakeful, nervous and excited. He was allowed his usual dose of paraldehyde (½ oz.) at bed-time on day of admission, but did not sleep at all during that night. At 9 a. m. the next day ½ oz. was given, but sleep did not follow. Patient being a physician, insisted on having a second dose, which was given at 1 p.m.

This was followed by a slight stage of excitement and the patient then fell asleep, and one hour later, stentorious breathing attracted the attention of the nurse, and upon going to his room patient was found to be in a deep stupor, from which he could not be aroused. The house physician was summoned and found patient cyanotic, breathing six to eight per minute and irregularly; pulse 120. Vigorous efforts to arouse patient, including forcible dilation of the anal sphincter, were unavailing. Strychnin, caffein and adrenalin were freely administed, but with no apparent benefit. One quart normal salt solution was given by rectum and faradic current appied to base of brain and over heart, and artificial respiration practiced. The writer was called from uptown office and saw patient at 3 p. m., two hours from time of giving last ½ oz. of paraldehyde, and one hour from that time stentorious breathing attracted the nurse's attention. At this time patient was deeply cyanotic, artificial respiration was stopped for a short time, during which three or four voluntary respiratory efforts per minute occurred. Pulse was 150 and of very small volume. One-half grain of cocaine was injected into the pectoral muscle, tnis point being selected because it was less cyanotic than other parts of the body. Artificial respiration was resumed and the body wrapped in heavy blankets, wrung out of hot

water. Faradic current to base of brain continued and normal salt solution by rectum and by hypodermoclysis was given in large quantities. Fifteen minutes from time of giving the first ½ gr. cocaine, another was given, and thirty minutes later one grain more was given. Considerably more vigor, in the few voluntary efforts at respiration, was noted in five minutes after the second ½ gr. dose of cocaine was given, and ten minutes after the one grain dose was given, six to eight voluntary efforts at respiration occurred per minute, and we were able to suspend artificial respiration for from five to ten minutes at a time without marked increase of cyanosis. Thirty minutes from the time of giving the first 1 gr. dose of cocaine, another grain was given, and within ten minutes from that time respiration was so improved that we were able to discontinue artificial respiration, his breathing then being from eight to ten per minute and fairly regular. This condition continued without noticeable change for forty minutes, when there was a slight decrease in respiratory movements. At this time one grain more cocaine was given, and in a few minutes marked improvement in respiration occurred. The rate increasing to ten or twelve per minute, and it was not necessary to administer further respiration. Cyanosis disappeared and after six hours of fairly normal sleep patient was aroused without difficulty, voided a large quantity of highly odorous urine, after which he was allowed to resume his sleep, which lasted several hours more.

In this case there was no perceptible response to any remedy except the cocaine, but the effect of that was most happy. The four physicians present were fully agreed that the free and timely administration of cocaine brought the case to a favorable issue, when death would have otherwise been inevitable.

While cocaine is not a remedy one would select by preference, because of the untoward effects which have so frequently been reported from it, still the author would call attention to the fact that in most of the cases where death has been recorded as occurring from the medicinal use of cocaine, convulsions or a state of intense excitement was induced by it, the patient at the time of administration being in apparently normal condition. However, had these patients been profoundly comatose, or suffering from opium or other forms of drug narcosis, it is more than likely that such condition, so far removed from a state of excitement or spasm, would have more than offset and neutralized the tendency of the drug to produce such unfavorable results.

The author has employed this remedy as a respiratory stimulant in cases of this type for a number of years with most happy results, and it is his belief that in cases where a respiratory stimulant is really necessary, it can be given with safety, and certainly with marked benefit.

DISCUSSION.

Dr. Louis Leroy, Memphis.—The subject of cocaine as a therapeutic agent is one that offers a number of contradictions which are, so far as I know, not explainable. There is a more or less indefinite law that frequently minute quantities of a drug have an opposite effect to what large quantities have in regular doses. In a general way, perhaps, something of this truth was recognized and used by the old advocates of homeopathy. It is said that some element of truth attaches to that principle. I have seen, as you all have seen, numbers of cases of cocaine collapse when the amount of the drug used has been infinitesimal. I have seen collapse with two or three drops of a one-fourth per cent solution used in the urethra. I have seen marked constitutional symptoms lasting for hours where a drop of dilute solution in the eye was used for the purpose of removing a small fragment. I have seen the same thing from the application of cocaine to the tonsil or nose, containing an almost immeasurable amount. These are things which tend to frighten us in the use of cocaine. Time and again I have seen collapse in dentistry where one drop perhaps of one-tenth of one per cent solution has been injected into the gum or beneath the peridental membrane. These minute doses can scarcely be taken as a definite therapeutic action of the drug without being able to discriminate accurately between the two. There is a distinction. There is a nervous reflex or nervous collapse which these minute doses sometimes produce, separate and apart, and seem to follow out lines different from the regular therapeutic administration of the drug in what we may call therapeutic doses of one-quarter or one-half or even a grain, and it does

not follow that because a person may be sensitive to the minute doses on a mucous membrane or the eye, that the therapeutic doses given hypodermically will cause collapse.

Another drug which is not quite so marked in its effect, and which has the same discrepancy as the effects of this drug, is hyoscin hydrobromate, which is a powerful hypnotic given in one one-hundredth of a grain doses. I have seen the four-hundredth of a grain render people almost insane, and I have seen people in whom that dose was quadrupled and repeated come right down to the ordinary action of therapeutic resistance of the drug without any change. There are some paradoxes in the effects of cocaine. It is a dangerous drug to be used. We do not use it indiscriminately, but I have seen, as the doctor has reported, marked stimulation result, which has been very marked in shock, in pneumonia; and above all, I believe it is of value in opium poisoning. The drug is valuable in the extreme in those cases in which we have got to resort to something. There is a rapid response usually to cocaine, and it can be given in doses of over a grain. One-quarter of a grain is the dose I have usually prescribed in my work. Dr. Petty has given it in still larger doses.

SECOND REPORT OF THE COMMISSION ON MILK STANDARDS, APPOINTED BY THE NEW YORK MILK COMMITTEE.*

CONTAINING RESOLUTIONS ADOPTED AT THE MEETING IN RICHMOND, VA., MAY 2-3, 1913.

By Wm. A. Evans, M.D.,
Chicago, Ill.

INTRODUCTION.

Personnel.

The New York Milk Committee, which is a voluntary organization working in the interests of improving the milk supply of New York City, in March, 1911, decided to appoint a commission on milk standards. The men who compose the commission are as follows:

Dr. W. A. Evans, professor preventive medicine, Northwestern University; health editor, Chicago Tribune, Chicago, Ill., chairman.

Dr. B. L. Arms, assistant, department biology and public health, Massachusetts Institute Technology, Boston, Mass.

Dr. John F. Anderson, director of hygienic laboratory, United States Public Health and Marine-Hospital Service, Washington, D. C.

Prof. W. H. Conn, director of bacteriological laboratory, Connecticut State Board of Health, department of biology, Wesleyan University, Middletown, Conn.

Dr. E. C. Levy, health officer, Richmond, Va.

Dr. A. D. Melvin, chief of Bureau of Animal Industy, United States Department of Agriculture, Washington, D. C.

Dr. William H. Park, director of laboratories, department of health of New York City, foot of East Sixteenth Street, New York City.

Mr. Raymond A. Pearson, president State College of Agriculture, Ames, Ia.

Dr. M. P. Ravenel, director of Hygienic Laboratory, University of Wisconsin, Madison, Wis.

Prof. M. J. Rosenau, department of hygiene and preventive medicine, Harvard Medical School, Boston, Mass.

Mr. Chester H. Wells, health officer, Montclair, N. J.

Dr. L. L. Van Slyke, department of chemistry, New York Agricultural Experiment Station, Geneva, N. Y.

Dr. Charles E. North, consulting sanitarian, member New York Milk Committee, New York, secretary.

Dr. J. N. Hurty, commissioner, State department of health, Indianapolis, Ind.

Dr. Joseph S. Neff, commissioner, department public health and charities, Philadelphia, Pa.

Dr. John S. Fulton, secretary, State department of health, Baltimore, Md.

ORIGIN AND ORGANIZATION.

The appointment of this commission was the direct result of the observation of the New York Milk Committee that there was great incompleteness and lack of uniformity in the milk standards, milk ordinances, and rules and regulations of public health authorities throughout the country for the control of public milk supplies. There was a need that health officers be furnished conclusions drawn from large experience and mature judgment and that ordinances should be as free from erroneous positions and as uniform as possible.

A special committee of the New York Milk Committee was appointed to consider names

*Read in section on Hygiene and Preventive Medicine of the Southern Medical Association, seventh annual meeting, Lexington, Ky., November 17-20, 1913.

of more than 200 men of prominence in medicine, sanitation, public health and laboratory work, particularly those recognized as authorities on the milk question. Since regulations are based on standards and standards are based chiefly on laboratory analyses, the subcommittee selected twenty names of men distinguished for their knowledge of the bacteriological and chemical examination of milk and for the enforcement of standards based on such laboratory examinations. Two of those chosen declined to serve and another resigned after the first meeting, so that there were seventeen members who have taken an active part in the work of the commission.

PURPOSES.

While this commission was created by and its expenses were borne by the New York Milk Committee, it has not been the intention of that committee that the commission should have the New York City milk problem solely in mind. It was desired that the commission should make recommendations that might be adopted by any city or town in the country.

CLASSIFICATION OF MILKS.

There is no escape from the conclusion that milk must be graded and sold on grade, just as wheat, corn, cotton, beef and other products are graded. The milk merchant must judge of the food value and also of the sanitary character of the commodity in which he deals. The high-grade product must get a better price than at present. The low-grade product must bring less. In separating milk into grades and classes the commission has endeavored to make its classification as simple as possible and at the same time to distinguish between milks which are essentially different in sanitary character.

In general two great classes of milk are recognized, namely, raw milk and pasteurized milk. Under these general classes there are different grades, as indicated in the report of the committee on classification.

Report.

PASTEURIZATION.

While the process of pasteurization is a matter which has attracted a great deal of attention in recent years, the commission has not entered into any discussion of its merits or demerits, but has given it recognition in its classification as a process necessary for the treatment of milk which is not otherwise protected against infection.

The commission thinks that pasteurization is necessary for all milk at all times, excepting grade A, raw milk. The majority of the commissioners voted in favor of the pasteurization of all milk, including grade A, raw milk. Since this was not unanimous, the commission recommends that the pasteurization of grade A, raw milk, be optional.

The process of pasteurization should be under official supervision by personal inspection of the milk inspector, which shall be as frequent as possible. Automatic temperature regulators and recording thermometers should be required and the efficiency of the process frequently determined by laboratory testing.

PASTEURIZING TEMPERATURES.

The destruction of the chemical constituents of milk by heat occurs at higher temperatures than those necessary for the destruction of the bacteria of infectious diseases transmissible by milk. (See chart in appendix.)

The commission passed a resolution regarding the temperature of pasteurization as follows:

That pasteurization of milk should be between the limits of 140 degrees F. and 155 degrees F. At 140 degrees F. the minimum exposure should be twenty minutes. For every degree above 140 degrees F. the time may be reduced by one minute. In no case should the exposure be for less than five minutes.

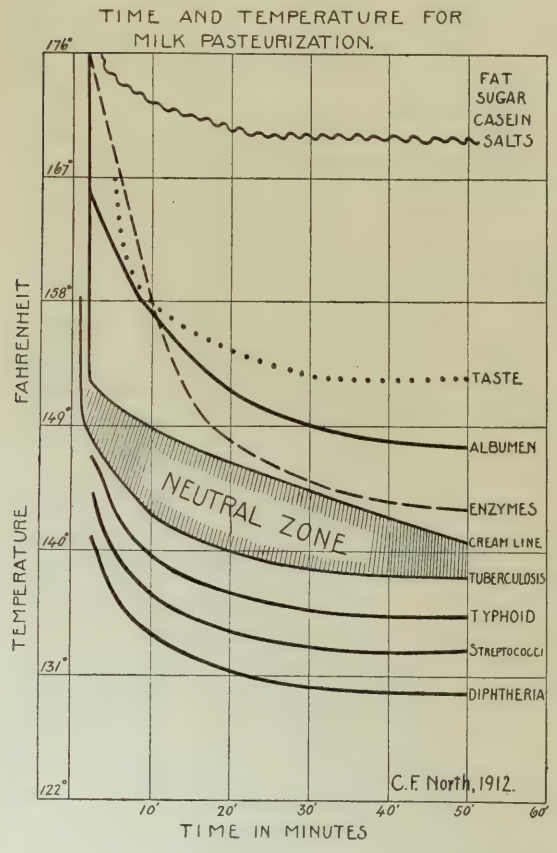
In order to allow a margin of safety under commercial conditions the commission recommends that the minimum temperature dur-

ing the period of holding should be made 145 degrees F. and the holding time thirty (30) minutes. Pasteurization in bulk when properly carried out has proven satisfactory, but pasteurization in the final container is preferable.

It is the sense of the commission that pasteurization in the final container should be encouraged.

LABELING AND DATING OF MILK.

The commission voted that all milk should



be labeled and marked with the grade in which it is to be sold. In dating milk uniform methods should be adopted for all grades of both raw milk and pasteurized milk, both using the day of the week or both using the day of the month. All milk should be dated uniformly with the date of delivery to the consumer. Raw milk should not be dated with the date of production while pasteurized milk is dated with the date of pasteurization, since this places certified milk at a disadvantage by making it possible for pasteurized milk of a lower grade to carry a later date. The stamping on the label of the day of the week is sufficient for dating.

BACTERIA.

The subject of bacteria in milk received more attention than any other matter brought before the commission. The commission recognizes that bacteria in milk in the majority of instances indicates dirt, or lack of refrigeration, or age, while in the minority of instances the bacteria of disease may be present. The routine laboratory methods for examining milk have as their purpose only the control over dirt, refrigeration and age, and it is a rare thing for a laboratory to undertake the examination of milk for the bacteria of disease. Milk with a high bacterial count is not necessarily harmful, but when used as a food, particularly for children, is a hazard too great to be warranted. Milk with a high bacteria count, therefore, should be condemned. Milks with small numbers of bacteria are presumed to be wholesome, unless there is reasonable ground for suspecting that they have been exposed to contagion.

BACTERIAL STANDARDS.

The commission recognizes the difficulty in interpreting bacterial counts. At times misleading conclusions have been drawn from such counts. In establishing the bacterial standards for a city it is always necessary to take into consideration the necessary age of the milk and in lesser measure the distance hauled and methods employed in its hauling. It will always be possible for a community which consumes milk produced on its own premises, or within twelve hours of its production, to insist upon and maintain a lower bacterial standard than can one where the milk is hauled many miles into town in a wagon, to be consumed within twenty-four hours after it is produced. In like manner this second type of city can always maintain a lower bac-

terial standard than a city where the general milk supply is hauled by railroad long distances and is several days old when consumed. In drawing conclusions as to the relative efficacy of milk control in cities comparison must be made between cities of the same class.

The commission deems it of the utmost importance that some standard method should be adopted for estimating and comparing the bacterial character of milks, since by this means only is it possible to grade and classify milks and to enforce bacterial standards. There is much diversity of opinion as to the best method of valuing bacterial counts. The average of a series gives results which are misleading about as frequently as otherwise. In the average a single high figure may unduly overbalance a large number of exceedingly low counts. There are objections to the use of the "median" or middle number when the counts are arranged in order of size, for the reason that the middle figure does not distinguish between two groups in one of which there may be some very high counts above the median and in the other of which there are none. The method of dividing results into groups, as recommended by the American Public Health Association, while a step in the right direction, is cumbersome and does not clearly indicate whether a milk conforms or not to a given bacterial standard.

LABORATORY EXAMINATIONS FOR BACTERIA.

On the subject of laboratory examinations of milk for bacteria, the commission passed the following resolutions:

1. That the interests of public health demand that the control of milk supplies shall include regular laboratory examinations of milk by bacteriological methods.

2. That among present available routine laboratory methods for determining the sanitary quality of milk the bacteria count occupies first place.

3. That bacteriological standards should be a factor in classifying or grading milks of different degrees of excellence.

4. That bacteriological examinations of milk are of importance at every stage of production and distribution, but that in the establishment of grades and classes of raw milk such grades and classes should be based on the bacterial content of milk as offered for sale.

5. That there should be bacteriological standards for milk before it is pasteurized and for milk after it is pasteurized.

6. That the bacteria count of milk indicates its quality and history as it is modified by unusual contamination, improper handling, dirt, improper refrigeration, or age. The high count indicates the necessity of investigation and inspection in order that remedies may be applied.

7. That there be adopted as standards for making the bacteria count the standard methods of the American Public Health Association, laboratory section, recommending, however, the following amendments:

a. The methods of taking samples for laboratory tests for bacterial counts should be the same and uniform for all grades and classes of milk.

b. That 1½ per cent agar be used instead of 1 per cent agar.

c. That incubation of plate cultures be made at 37 degrees C. for 48 hours, and that there be no option.

d. That the minimum number of bacteria tests of milk necessary to warrant the publication of results be made four consecutive bacteria counts of separate samples within a period of not more than four weeks.

8. The commission resolved to amend the standard methods of the American Public Health Association for bacteriological testing of milk by making the agricultural medium used for testing milk identical in its composition and reaction with the agricultural medium used for the testing of water provided in the standard methods of water analyses of the American Public Health Association.

The commission passed a resolution at its last meeting regarding the number of bacterial tests necessary to determine the grade into which a milk falls as follows:

"That the grade into which a milk falls shall be determined bacteriologically by at least five consecutive bacterial counts taken over a period of not less than one week, nor more than one month, and at least eighty (80) per cent (4 out of 5) must fall below the limit set for the grade for which the classification is desired."

The bacterial standards given in the report are the work of a special committee of bacteriologists who considered all of the bacterial standards now in use. It is believed that the standards suggested are fair and wise and give full consideration to the state of the industry and of public health control. The commission believes that the adoption and enforcement of these bacterial standards will be more effective than any other one thing in improving the sanitary character of public milk supplies. The enforcement of these standards can only be carried out by the regular

and frequent laboratory examinations of milks for the numbers of bacteria they may contain.

CHEMICAL STANDARDS.

The chemical standards suggested are the work of a special committee, composed of chemists, which has carefully considered the natural composition of milk and the Federal and State standards already established. The standard of 3.25 per cent fat and 8.5 per cent solids, not fat, here proposed is in accordance with the recommendations of the Association of Official Agricultural Chemists and has been adopted by the United States Department of Agriculture and by a larger number of States than has any other standard. The simplification of the Babcock test makes the determination of fats and solids not fat an easy procedure quickly applied. Such chemical examinations of milk can be readily adopted and executed by any health board laboratory at a very moderate expense. It is believed that such chemical standards as are suggested will inflict no real hardship on the milk producers of this country and that the provision regarding substandard milk is a liberal one.

MICROSCOPIC EXAMINATION OF MILK.

Because of studies which have been made during the past year the commission thinks it wise to temporarily omit any definite statement on the subject of microscopical examination of milk, and the determination of pus and bacteria by sedimentation methods, until further studies have been made. A special subcommitee has been appointed for this purpose, which will make studies during the present year and the commission will take action on this matter at one of its later meetings.

MISLABELING.

The commission resolved that the sale of milk which is mislabeled or misbranded shall be punished by suitable penalties.

PUBLICITY.

The commission fully considered the matter of the publication of laboratory examinations of milk by city and town health authorities. When proper standards and regulations are established and adequate facilities furnished for laboratory work, it is believed that the laboratory tests will give an index of the character of the milk delivered to the public by milk sellers which is entirely fair and impartial. There can be no objection to publicity under such circumstances. It is an advantage to the seller of high-grade milk. It is an advantage to the consumer who desires to select a high-grade milk. It has much educational value both to producer and consumer. Therefore the commission recommends "that the reports of laboratory analyses of milk made by departments of health be regularly published."

MEDICAL INSPECTION.

It is the sense of the commission that the medical inspection of dairy employes should be emphasized in all ways possible.

MILK DEALER'S LICENSE.

The commission resolved that a dealer shall be required to have a permit or license to sell any grade or class of milk and to use a label for such grade or class. Such permit or license shall be revoked and the use of the label forbidden when the local health authorities shall determine that the milk is not in the class or grade designated.

DESIGNATION OF GRADE.

The commission resolved that the grade of milk shall be designated by letter. It is the sense of the commission that the essential part is the lettering and that all other words on the label are explanatory.

In addition to the letters of the alphabet, used on cap or labels, the use of other terms may be permitted so long as such terms are not the cause of deception.

Caps and labels shall state whether milk is raw or pasteurized. The letter designating the grade to which milk belongs shall be conspicuously displayed on the caps of bottles or the labels on cans.

CLASSIFICATION OF MILK.

It was resolved that the classification of milk contained in the first report of the commission be amended as follows:

Milk shall be divided into three grades which shall be the same for both large and small cities and towns, and which shall be designated by the first three letters of the alphabet. The requirements shall be as follows:

Grade A.

Raw Milk—Milk of this class shall come from cows free from disease, as determined by frequent bacteriological tests and physical examinations by a qualified veterinarian, and shall be produced and handled under such sanitary conditions that the bacterial count shall not exceed 100,000 per cubic centimeter at the time of delivery to the consumer. It is recommended that dairies from which this supply is obtained shall score at least eighty (80) on the United States Bureau of Animal Industry score card.

Pasteurized Milk—Milk of this class shall come from cows free from disease, as determined by frequent physical examinations by a qualified veterinarian, and shall be produced and handled under such sanitary conditions that the bacterial count at no time exceeds 200,000 per cubic centimeter. All milk of this class shall be pasteurized under official supervision and the bacterial count shall not exceed 10,000 per cubic centimeter at the time of delivery to the consumer. It is recommended that dairies from which this supply is obtained should score sixty-five (65) on the United States Bureau of Animal Industry score card.

The above represents only the minimum standards under which milk may be classified in grade A. The commission recognizes, however, that there are grades of milk which are produced under unusually good conditions, in especially sanitary dairies, many of which are operated under the supervision of medical associations, which milks clearly stand at the head of this grade.

Grade B.

Milk of this class shall come from cows free from disease, as determined by frequent physical examinations, of which one each year shall be by a qualified veterinarian, and shall be produced and handled under such sanitary conditions that the bacterial count at no time exceeds 1,000,000 per cubic centimeter. All milk of this class shall be pasteurized under official supervision, and the bacterial count shall not exceed 50,000 per cubic centimeter when delivered to the consumer.

It is recommended that dairies producing grade B milk should be scored and that the health departments, or the controlling departments, whatever they may be, strive to bring these scores up as rapidly as possible.

Grade C.

Milk of this class shall be from cows that are free from disease, as determined by physical examinations, and shall include all milk that is produced under conditions such that the bacterial count is not in excess of 1,000,000 per cubic centimeter.

All milk of this class shall be pasteurized, or heated to a higher temperature, and shall contain less than 50,000 bacteria per cubic centimeter when delivered to the customer. It is recommended that this milk be used for cooking or manufacturing purposes only, with the proviso that milk which contains over 10,000,000 bacteria per cubic centimeter instead of being pasteurized shall be heated to the boiling point, then cooled and stored in accordance with the requirements for pasteurized milk.

Whenever any large city or community finds it necessary on account of the length of haul or other peculiar conditions to allow the sale of grade C milk, its sale shall be surrounded by such safeguards as to insure the restriction of its use to cooking and manufacturing purposes.

CLASSIFICATION OF CREAM.

Cream should be classified in the same grades as milk, in accordance with the requirements of the grades of milk, with special bacterial standards which should not exceed 30,000 per cubic centimeter in the case of grade A—300,000 per cubic centimeter in the case of grade B. Bacterial limits for grade C cannot at the present time be specified.

CHEMICAL STANDARDS.

Cow's milk.—Standard milk should contain not less than 8.5 per cent of milk solids not fat and not less than 3.25 per cent of milk fat.

Skim milk.—Standard skim milk should contain not less than 8.75 per cent of milk solids.

Cream.—Standard cream contains not less than 18 per cent of milk fat and is free from all constituents foreign to normal milk. The percentage of milk fat in cream over or under that standard should be stated on the label.

Buttermilk.—Buttermilk is the product that remains when fat is removed from milk or cream, sweet or sour, in the process of churning. Standard buttermilk contains not less

than 8.5 per cent of milk solids. When milk is skimmed, soured, or treated so as to resemble buttermilk, it should be known by some distinctive name.

HOMOGENIZED MILK OR CREAM.

The commission is of the opinion that in the compounding of milk no fats other than milk fats from the milk in process should be used and that no substance foreign to milk should be added to it. The commission is opposed to the use of condensed milk or other materials for the thickening of cream unless the facts are clearly set forth on the label of the retail package. Regarding the process of homogenizing the commission resolved as follows:

That homogenized milk or cream should be so marked, stating the percentage of fat that it contains.

ADJUSTED MILKS.

On the question of milks and creams in which the ratio of the fats to the solids not fat has been changed by the addition to or subtraction of cream or milk fat the commission has hesitated to take a position. On the one hand they are in favor of every procedure which will increase the market for good milk and make the most profitable use of every portion of it. On the other, they recognize the sensitiveness of milk, the ease with which it is contaminated, and the difficulty of controlling, standardizing, skimming, homogenizing, souring, etc., so that contaminations do not occur and inferior materials are not used. On this subject the commission passed a resolution presented by a special committee as follows:

Milk in which the ratio of the fats to the solids not fat has been changed by the addition to or subtraction of cream should be labeled "adjusted milk"; the label should show the minimum guaranteed percentage of fat and should comply with the same sanitary or chemical requirements as for milk not so standardized or modified.

REGULATION OF MARKET MILK ON BASIS OF GUARANTEED PERCENTAGE COMPOSITION.

1. Sellers of milk should be permitted choice of one or two systems in handling market milk. Milk can be sold, first, under the regular standard, or, second, under a guaranteed statement of composition.

2. Any normal milk may be sold if its per cent of fat is stated. In case the per cent of fat is not stated, the sale will be regarded as a violation unless the milk contains at least 3.25 per cent of milk fat.

3. As a further protection to consumers, it is desirable that when the guaranty system is used there be also a minimum guaranty of milk solids not fat of not less than 8.5 per cent.

4. Dealers electing to sell milk under the guaranty system should be required to state conspicuously the guaranty on all containers in which such milk is handled by the dealer or delivered to the consumer.

5. The sale of milk on a guaranty system should be by special permission obtained from some proper local authority.

STANDARD RULES FOR THE PRODUCTION, HANDLING AND DISTRIBUTION OF MILK.

As a basis for the promulgation of rules and recommendations governing the production, handling and distribution of milk, it is recognized that we have to deal with two kinds of milk, raw and pasteurized, although there may be several grades of each of these two kinds. In order for any grade to be safe, it is recommended that the regulations herein set forth under the heading "Requirements" should be enforced. The regulations herein set forth under the heading "Recommendations" should be adopted wherever practicable as a means of improving the milk supply above the actual point of safety. (The term "milk" shall be construed to include the fluid derivatives of milk wherever such construction of the term is applicable.)

LICENSES.

REQUIREMENTS.

No person shall engage in the sale, handling or distribution of milk in ———— until he has obtained a license therefor from the health authorities. This license shall be renewed on or before the 1st day of ———— of each year and may be suspended or revoked at any time for cause.

RECOMMENDATIONS.

The application for the license shall include the following statements:

(1) Kind of milk to be handled or sold.

(2) Names of producers with their addresses and permit numbers.

(3) Names of middlemen with their addresses.

(4) Names and addresses of all stores, hotels, factories, and restaurants at which milk is delivered.

(5) A statement of the approximate number of quarts of milk, cream, buttermilk, and skim milk sold per day.

(6) Source of water supply at farms and bottling plants.

(7) Permission to inspect all local and out-of-town premises on which milk is produced and handled.

(8) Agreement to abide by all the provisions of State and local regulations.

PERMITS.

REQUIREMENTS.

No person shall engage in the production of milk for sale in ————, nor shall any person engage in the handling of milk for shipment into ———— until he has obtained a permit therefor from the health authorities. This permit shall be renewed on or before the 1st day of ———— of each year and may be suspended or revoked at any time for cause.

RAW MILK.

COW STABLES.

REQUIREMENTS.

1. They shall be used for no other purpose than for the keeping of cows, and shall be light, well ventilated, and clean.

2. They shall be ceiled overhead if there is a loft above.

3. The floors shall be tight and sound.

4. The gutters shall be water-tight.

RECOMMENDATIONS.

1. The window area shall be at least 2 square feet per 500 cubic feet of air space and shall be uniformly distributed, if possible. If uniform distribution is impossible, sufficient additional window area must be provided so that all portions of the barn shall be adequately lighted.

2. The amount of air space shall be at least 500 cubic feet per cow, and adequate ventilation besides windows shall be provided.

3. The walls and ceilings shall be whitewashed at least once every six months, unless the construction renders it unnecessary, and shall be kept free from cobwebs and dirt.

4. All manure shall be removed at least twice daily and disposed of so as not to be a source of danger to the milk either as furnishing a breeding place for flies or otherwise.

5. Horse manure shall not be used in the cow stable for any purpose.

MILK ROOM.

REQUIREMENTS.

Every milk farm shall be provided with a milk room that is clean, light and well screened. It shall be used for no other purpose than for the cooling, bottling and storage of milk and the operations incident thereto.

RECOMMENDATIONS.

1. It shall have no direct connection with any stable or dwelling.

2. The floors shall be of cement or other impervious material, properly graded and drained.

3. It shall be provided with a sterilizer unless the milk is sent to a bottling plant, in which case the cans shall be sterilized at the plant.

4. Cooling and storage tanks shall be drained and cleaned at least twice each week.

5. All drains shall discharge at least 100 feet from any milk house or cow stable.

COWS.

REQUIREMENTS.

1. A physical examination of all cows shall be made at least once every six months by a veterinarian approved by the health authorities.

2. Every diseased cow shall be removed from the herd at once and no milk from such cows shall be offered for sale.

3. The tuberculin test shall be applied at least once a year by a veterinarian approved by the health authorities.

4. All cows which react shall be removed from the herd at once, and no milk from such cows shall be sold as raw milk.

5. No new cows shall be added to a herd until they have passed a physical examination and the tuberculin test.

6. Cows, especially the udders, shall be clean at the time of milking.

7. No milk that is obtained from a cow within fifteen days before or five days after parturition, nor any milk that has an unnatural odor or appearance, shall be sold.

8. No unwholesome food shall be used.

RECOMMENDATIONS.

1. Every producer shall allow a veterinarian employed by the health authorities to examine his herd at any time under the penalty of having his supply excluded.

2. Certificates showing the results of all examinations shall be filed with the health authorities within ten days of such examinations.

3. The tuberculin tests shall be applied at least once every six months by a veterinarian approved by the health authorities, unless on the last previous test no tuberculosis was present in the herd or in the herds from which new cows were obtained, in which event the test may be postponed an additional six months.

4. Charts showing the results of all tuberculin tests shall be filed with the health authorities within ten days of the date of such test.

5. The udders shall be washed and wiped before milking.

EMPLOYEES.

REQUIREMENTS.

1. All employees connected in any way with the production and handling of milk shall be personally clean and shall wear clean outer garments.

2. The health authorities shall be notified at once of any communicable disease in any person that is in any way connected with the production or handling of milk, or of the exposure of such person to any communicable disease.

3. Milking shall be done only with dry hands.

RECOMMENDATIONS.

1. Clean suits shall be put on immediately before milking.

2. The hands shall be washed immediately before milking each cow, in order to avoid conveyance of infection to the milk.

UTENSILS.

REQUIREMENTS.

1. All utensils and apparatus with which milk comes in contact shall be thoroughly washed and sterilized, and no milk utensil or apparatus shall be used for any other purpose than that for which it was designed.

2. The owner's name, license number or other identification mark, the nature of which shall be made known to the health authorities, shall appear in a conspicuous place on every milk container.

3. No bottle or can shall be removed from a house in which there is, or in which there has recently been, a case of communicable disease until permission in writing has been granted by the health authorities.

4. All metal containers and piping shall be in good condition at all times. All piping shall be sanitary milk piping, in couples short enough to be taken apart and cleaned with a brush.

5. Small-top milking pails shall be used.

RECOMMENDATIONS.

1. All cans and bottles shall be cleaned as soon as possible after being emptied.

2. Every conveyance used for the transportation or delivery of milk, public carriers excepted, shall bear the owner's name, milk-license number, and business address in uncondensed gothic characters at least 2 inches in height.

MILK.

REQUIREMENTS.

1. It shall not be strained in the cow stable, but shall be removed to the milk room as soon as it is drawn from the cow.

2. It shall be cooled to 50 degrees F. or below within two hours after it is drawn from the cow and it shall be kept cold until it is delivered to the consumer.

3. It shall not be adulterated by the addition to or the subtraction of any substance or compound, except for the production of the fluid derivatives allowed by law.

4. It shall not be tested by taste at any bottling plant, milk house, or other place in any way that may render it liable to contamination.

5. It shall be bottled only in a milk room or bottling plant for which a license or permit has been issued.

6. It shall be delivered in bottles, or single service containers, with the exception that 20 quarts or more may be delivered in bulk in the following cases:

(*a*) To establishments in which milk is to be consumed or used on the premises.

(*b*) To infant-feeding stations that are under competent medical supervision.

7. It shall not be stored in or sold from a living room or from any other place which might render it liable to contamination.

RECOMMENDATIONS.

1. It shall be cooled to 50 degrees F. or below immediately after milking and shall be kept at or below that temperature until it is delivered to the consumer.
2. It shall contain no visible foreign material.
3. It shall be labeled with the date of production.

RECEIVING STATIONS AND BOTTLING PLANTS.

REQUIREMENTS.

1. They shall be clean, well screened, and lighted, and shall be used for no other purpose than the proper handling of milk and the operations incident thereto, and shall be open to inspection by the health authorities at any time.

2. They shall have smooth, impervious floors, properly graded and drained.

3. They shall be equipped with hot and cold water and steam.

4. Ample provision shall be made for steam sterilization of all utensils, and no empty milk containers shall be sent out until after such sterilization.

5. All utensils, piping, and tanks shall be kept clean and shall be sterilized daily.

RECOMMENDATIONS.

1. Containers and utensils shall not be washed in the same room in which milk is handled

STORES.

REQUIREMENTS.

1. All stores in which milk is handled shall be provided with a suitable room or compartment in which the milk shall be kept. Said compartment shall be clean and shall be so arranged that the milk will not be liable to contamination of any kind.

2. Milk shall be kept at a temperature not exceeding 50 degrees F.

RECOMMENDATIONS.

1. Milk to be consumed off the premises may be sold from stores only in the original unopened package.

GENERAL REGULATIONS.

1. The United States Bureau of Animal Industry score card shall be used, and it is recommended that dairies from which milk is to be sold in a raw state shall score at least seventy (70) points.

2. Every place where milk is produced or handled and every conveyance used for the transportation of milk shall be clean.

3. All water supplies shall be from uncontaminated sources and from sources not liable to become contaminated.

4. The license or permit shall be kept posted in a conspicuous place in every establishment for the operation of which a milk license or permit is required.

5. No milk license or permit shall at any time be used by any person other than the one to whom it was granted.

6. No place for the operation of which a license or permit is granted shall be located within 100 feet of a privy or other possible source of contamination, nor shall it contain or open into a room which contains a water-closet.

7. No skim milk or buttermilk shall be stored in or sold from cans or other containers unless such containers are of a distinctive color and permanently and conspicuously labeled "skim milk" or "buttermilk," as the case may be.

8. No container shall be used for any other purpose than that for which it is labeled.

RECOMMENDATIONS.

1. Ice used for cooling purposes shall be clean and uncontaminated.
2. No person whose presence is not required shall be permitted to remain in any cow stable, milk house, or bottling room.

SUBNORMAL MILK.

REQUIREMENTS.

1. Natural milk that contains less than 3.25 per cent, but more than 2.5 per cent milk fat, and that complies in all other respects with the requirements above set forth, may be sold, provided the percentage of fat does not fall

below a definite percentage that is stated in a conspicuous manner on the container; and further provided that such container is conspicuously marked "substandard milk."

CREAM.

REQUIREMENTS AND RECOMMENDATIONS.

1. It shall be obtained from milk that is produced and handled in accordance with the provisions hereinbefore set forth for the production and handling of milk.

STANDARDS FOR MILK.

REQUIREMENTS.

1. It shall not contain more than 100,000 bacteria per cubic centimeter.

2. It shall contain not less than 3.25 per cent milk fat.

3. It shall contain not less than 8.5 per cent solids not fat.

RECOMMENDATIONS.

1. The bacterial limit shall be lowered if possible.

STANDARDS FOR CREAM.

REQUIREMENTS

1. It shall not contain more than 300,000 bacteria per cubic centimeter.

2. It shall contain not less than 18 per cent milk fat.

RECOMMENDATIONS.

Same as above for milk.

STANDARDS FOR SKIM MILK.

REQUIREMENTS.

1. It shall contain not less than 8.75 per cent milk solids.

2. Control of sale of skim milk: Whether skim milk is sold in wagons or in stores, all containers holding skim milk should be painted some bright distinctive color and prominently and legibly marked "skim milk." When skim milk is placed in the buyer's container, a label or tag bearing the words "skim milk" should be attached.

PASTEURIZED MILK.

Pasteurized milk is milk heated to a temperature of not less than 140° F. for not less than 20 minutes, or not over 155° F. for not less than 5 minutes, and for each degree of temperature over 140° F. the length of time may be 1 minute less than 20. Said milk shall be cooled immediately to 50° F. or below and kept at or below that temperature.

COW STABLES.

REQUIREMENTS.

The same as for the production of raw milk.

RECOMMENDATIONS.

The same as for the production of raw milk.

MILK ROOM.

REQUIREMENTS.

The same as for the production of raw milk.

RECOMMENDATIONS.

The same as for the production of raw milk.

COWS.

REQUIREMENTS.

The same as for the production of raw milk, with the exception of the sections relating to the tuberculin test.

RECOMMENDATIONS.

That no cows be added to a herd excepting those found to be free from tuberculosis by the tuberculin test.

EMPLOYES.

The same as for the production of raw milk.

RECOMMENDATIONS.

The same as for the production of raw milk.

UTENSILS.

REQUIREMENTS.

The same as for the production of raw milk.

RECOMMENDATIONS.

The same as for the production of raw milk.

MILK FOR PASTEURIZATION.

REQUIREMENTS.

1. The same as for the production of raw milk, with the exception of sections 1, 2 and 6*b*.

2. It shall be cooled to 60° F. or below within two hours after it is drawn from the cow, and it shall be held at or below that temperature until it is pasteurized. After pasteurization, it shall be held at a temperature not exceeding 50° until delivered to the consumer.

3. Pasteurized milk shall be distinctly labeled as such, together with the temperature at which it is pasteurized, and the shortest

length of exposure to that temperature and the date of pasteurization.

RECOMMENDATIONS.

1. No milk shall be repasteurized.
2. The requirements governing the production and handling of milk for pasteurization should be raised wherever practicable.

PASTEURIZING PLANTS.

REQUIREMENTS.

The same as under "Receiving stations and bottling plants" for raw milk.

RECOMMENDATIONS.

The same as under "Receiving stations and bottling plants" for raw milk.

STORES.

REQUIREMENTS.

The same as for raw milk.

RECOMMENDATIONS.

The same as for raw milk.

GENERAL REGULATIONS.

1. It is recommended that dairies producing milk which is to be pasteurized shall score at least forty (40) points on the United States Bureau of Animal Industry score card, and that milk from dairies scoring below forty (40) shall not be pasteuried for sale, except for industrial purposes.

2. Milk from cows that have been rejected by the tuberculin test, but which show no physical signs of tuberculosis, as well as those which have not been tested, may be sold provided that it is produced and handled in accordance with all the other requirements herein set forth for pasteurized milk.

3. Ice used for cooling purposes shall be clean.

RECOMMENDATIONS.

The same as for raw milk.

PASTEURIZED CREAM.

REQUIREMENTS.

1. It shall be obtained only from milk that could legally be sold as milk under the requirements hereinbefore set forth.

2. Pasteurized cream, or cream separated from pasteurized milk, shall be labeled in the manner herein provided for the labeling of pasteurized milk.

STANDARDS FOR PASTEURIZED MILK.

REQUIREMENTS.

1. It shall not contain more than 1,000,000 bacteria per cubic centimeter before pasteurization nor over 50,000 when delivered to the consumer, and no colon bacilli in 1 cubic centimeter as determined by cultural methods.

2. The standards for the percentage of milk fat and of total solids shall be the same as for raw milk.

RECOMMENDATIONS.

1. The limits for the bacterial count before pasteurization and after pasteurization should both be lowered if possible.

STANDARDS FOR PASTEURIZED CREAM.

REQUIREMENTS.

1. No cream shall be sold that is obtained from pasteurized milk that could not be legally sold under the provisions herein set forth, nor shall any cream that is pasteurized after separation contain an excessive number of bacteria.

2. The bacterial count of pasteurized cream shall not exceed 100,000 bacteria per cubic centimeter when delivered to the consumer.

3. The percentage of milk fat shall be the same as for raw cream.

PENALTY.

Every milk ordinance should contain a penalty clause.

"DAIRY INSPECTION IN CINCINNATI."*

By J. H. Landis, M. D.,
Health Officer, Cincinnati, O.

The story of Cincinnati's crusade for pure milk, if written by an author of one of the best sellers, would make a narrative full of human interest.

It would not be a "pretty story" for the reason that it would disclose big business and dense ignorance arrayed against the innocent

*Read in Section on Hygiene and Preventive Medicine of Southern Medical Association, seventh annual meeting, Lexington, Ky., November 17-20, 1913.

and defenseless, a plethoric pocketbook against the cradle, dividends versus infant lives.

It would disclose selfish interests intrenched behind stone walls of custom and ignorance, against which progress and humanitarianism charged and fell back defeated and disheartened but not disgraced.

It would follow step by step the development of a public sentiment and conscience which finally rescued the milk industry from custom and tradition's hopeless rut.

It would include a table of vital statistics showing in cold type the helpless infants slaughtered in a battle in which none of the principals engaged were left dead on the firing line.

It would picture a scene in which astute lawyers entered into an unholy alliance with vested interests; one in which the Destroying Angel swung his scythe with deadly accuracy while the disciples of the only exact science freighted the atmosphere with legal quibbles concerning the crossing of a "t" or the dotting of an "i."

It would depict a scene of ideal domesticity; a home in which hope and affection centered in a rotund, laughing child, with desolation threatening like a dark cloud. It would show with the fidelity of a moving picture the ravages of cholera infantum; the chubby body reduced to a bag of bone, the once bright eyes, glazed, surrounded by great dark rings, sunk deep in their almost empty caverns. It would include a funeral oration in which the Father of us all, instead of the milk man, would be solemnly charged with the tragedy and credited with motives so base and vile, so little and contemptible that an oil immersion lens and staining fluid would be necessary to make Him perceptible to human vision.

Cincinnati's problem can be duplicated in a few large cities in this country. It was a problem created in part by the industries located in our city, industries in which the manufacturing wastes from the distilleries were utilized for dairy rations. Slop feed was cheap; it would fatten cattle. While being fattened, they would produce milk and produce it at a cost so low that competition outside the slop-fed district was almost impossible. The production of milk was a by-product incident to the fattening of cattle for beef purposes.

No one denied that slop feed had a value as a dairy ration, or that the milk produced came up to the legal standard chemically. It was the impossible conditions created in the dairy that made its elimination as a dairy ration imperative.

Slop feed contains a large amount of water, and in order that cattle obtain sufficient food it was necessary for them to drink enormous quantities of slop. The slop feed ration has irritating qualities resulting in chronic diarrhoea. Added to this was the enormous quantities of urine passed. Dairies in large numbers began business in the section of the city within easy hauling distance of the distilleries. Stable wastes were drained out upon the premises, and it was not unusual to find a dairy practically surrounded by a sea of liquid manure.

Constant evacuation of the bowels and bladder made it impossible to keep a dairy barn in anything approximating a sanitary condition. The walls, ceilings, floors, utensils, cattle and workers were contaminated, sometimes literally plastered with filth.

Cows were kept in the stables for months at a time without once going into the open air. Their bodies became caked with dried manure, frequently several inches thick, and in the spring—during the shedding season—it was not unusual to see a practically bare surface of skin covering an area of several square feet which had shed its accumulation of filth en masse.

The udders were constantly covered with filth. Wet milking was very widely practiced, and it was a common occurrence to find filth oozing from between the fingers and dripping from the hand into the bucket of the milker. In one instance, milk rushed from such a dairy to the laboratory and plated immediately.

yielded a bacterial count of over eleven million to the cubic centimeter.

Stone age ideas concerning sunlight and fresh air prevailed very extensively, and many dairies excluded both. During cold weather, these almost air-tight barns were filled with a thick fog, and could only be negotiated with the aid of a lantern.

In this atmosphere of "Jeffersonian simplicity," Cincinnati's infants had their breakfast food prepared for the market!

It was this state of affairs that confronted Dr. Samuel E. Allen when he became health officer January 1, 1906.

He immediately started an investigation of conditions, and submitted a report in March, 1906. Previous to this report, and following it, he displayed what might be classified as pernicious activity in educating the general public concerning dairy conditions. He appeared before the Academy of Medicine, women's clubs, church and business organizations, and, in fact, wherever and whenever he could find an auditor, illustrating his talks with sediment exhibits and photographic views.

The first fruits of his victory were realized when the Board of Health in July passed a regulation forbidding in whole or in part the use of wet distillery waste, distillery slop or starch slop as food for dairy cows.

During the same month another regulation was adopted prohibiting the sale of milk the temperature of which was above 50 degrees Fahrenheit.

During the latter part of August the distillery waste subject came up again, and the good accomplished in July was practically wiped out by permitting feeding of from twelve to fifteen gallons of slop per day per cow, according to the season of the year, provided that to each gallon of slop one and one-half pounds of dry feed should be added.

Each dairyman was required to keep an account of both kinds of feed used, the records to be open for inspection at any time on demand by a representative of the health department. Bookkeeping at once became one of the polite accomplishments of those engaged in the dairy industry, and was reduced to such a fine art that Dr. Allen harbored the suspicion that his department was being given what is technically known as the "double cross."

The minutes of the Board from this time on contain numerous references to dairy permits revoked or refused on the ground of failure to comply with the regulations.

In December, 1907, the Board, by unanimous vote, petitioned the Legislature to make the sale of milk from cows fed on wet distillery waste, distillery slop or starch slop a penal offense.

January 1, 1908, ushered in a new administration, and the crusade for pure milk was taken up with enthusiasm by Health Officer Dr. Mark A. Brown.

In February, the Chief Milk Inspector was authorized to go to Columbus, and represent the Board before the agricultural committee, which was considering a bill to eliminate slop feed. He reported that he had taken the ground that "the pending measure offers no remedy for conditions in Cincinnati. That the vital question involved was not one of feeding but one of sanitation, and that the method being pursued by the Board of Health of Cincinnati of compelling absolute cleanliness in dairies has demonstrated beyond a doubt that a wet or slop feed dairy can be kept clean and in perfect sanitary condition."

He informed the Board that the Committee on Agriculture had decided to make a personal investigation, and recommended that additional dairy inspectors be appointed to enforce sanitary conditions.

The argument that "the question involved was not one of feeding but one of sanitation" would find a parallel in a case of cholera infantum due to impure milk when the remedy was directed to keeping the body and clothing of the patient clean instead of substituting pure for unwholesome milk.

One week later after the visit of the committee, he reported that "in the opinion of your representative, enough was shown to demon-

strate that the contention of the Health Department that the whole matter was one of sanitation and not one of feeding, is the true solution of the pure milk problem."

The Committee on Agriculture evidently thought otherwise, for it returned to Columbus and promptly recommended the passage of a bill eliminating slop feed as a dairy ration. This bill, known as the Espy Bill, passed, and the Board promptly adopted a resolution giving dairymen until June 1 (25 days) to install proper water supply, and directing employes "to take such steps as shall be deemed necessary to secure compliance with the provisions of this law."

That Health Officer Brown had his troubles in enforcing the Espy law is eloquently set forth in the minutes of the Board.

Twenty arrests were reported on August 25, 1908. Prosecution was bitterly contested in Police Court, and every conceivable obstacle placed in the way of law enforcement.

Under date of December 8 appears the following resolution: "That the Health Officer of the city be, and he hereby is instructed and authorized by the Board to proceed without delay for the betterment of the milk supply of the city of Cincinnati by revoking the permits of such dairymen as are engaged in the feeding of distillery waste, and those whose dairies may be found by him to be in an unsanitary condition by reason of the same."

This resolution was "referred to the City Solicitor for his opinion as to the powers of the Board in the premises." His reply, in substance, was to the effect that while the Board could not delegate its powers to the Health Officer, it could revoke permits because of unsanitary conditions, be they due to slop feeding or any other cause; that while the Espy law did not provide revocation of permits as the specific remedy for that offense, that if "the Board, in their discretion," should "decide that in order to carry out the objects enumerated, it is necessary to revoke permits of those dairymen who feed distillery waste to their cows," they "would have the power to do so."

In the meantime, Dr. Brown had continued the work of education started by Dr. Allen. Powerful newspaper editorials, photographs of actual conditions, and cartoons rapidly crystallized a public sentiment that swept the last line of defense held by slop-feed interests.

It is due the Fleischmann Distillery interests to state that following the passage of the Espy law, they discontinued the sale of slop feed to dairymen. It would be unfair to state that the sloop feed practice terminated abruptly. There is an old bit of superstition to the effect that a mortally wounded snake lives until after the sun goes down. The slop feed snake showed signs of life long after the sun had set on the slop feed industry, and isolated cases were discovered after I became Health Officer, January 1, 1910.

The credit for starting the campaign against slop feed and carrying it to a successful termination belongs to Health Officers Allen and Brown.

Upon the foundation of achievement constructed by these two men, the work has been continued up to the present time.

Milk-borne diseases are charged to the dairyman supplying the home in which the disease occurs. We know how many gallons each man handles, and start an investigation as soon as he has an undue percentage of cases. In three instances, the source of typhoid has been accurately determined on the report of three cases, and the outbreaks limited to five cases in two outbreaks and eight in the third.

At present all retail milk is delivered in sealed bottles, the seal bearing the name of the distributor. Our bottle law is over four years old.

Vigorous prosecutions in Police Court have reduced the number of substandard chemical samples during the last four years.

The increase noted in our annual report for 1912 over the preceding year is easily explained and is due to three reasons:

1. An increased number of samples have been taken from chronic offenders.

2. A system of Sunday raids was inaugurated demonstrating that some men could be honest six days in the week, but that they strayed from the path of rectitude when they had reason to believe that our inspectors were not on the job. Seven of these raids during 1912 convinced numerous offenders that it is a good rule to "Remember the Sabbath day and keep it holy.'

3. The territory covered is constantly being broadened and has served to demonstrate in some few instances that the traditional belief in the honesty of all farmers is built upon sand, a belief that has been washed away by the water which a small minority of them added to their milk.

No calling has a membership made up entirely of honest men. That would be entirely too exclusive. In dealing with that invaluable political asset the "honest farmer," dairy inspectors must be from Missouri. Many who adulterate milk have inherited the habit and see no harm in following a custom which time has almost made respectable. That this is true is shown by the fact that practically all offenders cease the practice when confronted by the evidence.

During the latter part of 1910 a complete reorganization of the department was adopted by the Board, and became effective January 1, 1911.

A Chief Food Inspector was appointed on full time. He was taken from the Bureau of Animal Industry of the Federal Government. He was a veterinarian with wide experience in milk and dairy inspection.

Three hundred and fifty dairies had been under inspection up to January 1, 1911. By the end of the year thirty-five hundred had been brought under inspection.

Our average bacterial count in 1910 was 5,700,000. During 1911, it fell to 770,000, and in 1912 to 520,000. In 1910, we lost 378 infants under two years of age from diarrhoeal diseases; during 1911, 272; the same number during 1912, and 245 during 1913.* The bacterial count shows a steady decline, and much of the market milk offered for sale comes within the bacteriological requirements of certified milk. A large proportion of it is within the inspected milk requirements.

Sanitary improvements have raised the tone of the whole industry, and among our most loyal supporters now may be found men who were our most vigorous opponents three years ago. They take as much pride in what they have done as does the department, and fresuently assert that they would not go back to the old methods for any money consideration.

Publicity and prosecution are the most potent factors in improving dairy conditions. Moral suasion has its place, but one successful Police Court prosecution, with the attendant publicity as an educator, reaches the understanding which is located in the pocketbook. Moral suasion speaks in a whisper; prosecution delivers its message in stentorian tones through a megaphone.

Arguments based on bacterial counts mean little or nothing; a fifty-dollar fine can be understood by anyone.

Through the weekly report of the Board of Health, dairy scores, bacterial counts and chemical analyses are printed of all dairymen supplying the Cincinnati market. Marked copies are sent to every man whose name appears in the report, and with it a letter of instructions if the report is not up to requirements. Through the weekly report the public may get an accurate idea of how the different dairymen stand.

These reports serve to arouse a feeling of rivalry among the dairymen, and awaken an incentive to stand in the best class attainable.

Their material interests are not neglected, and valuable suggestions are given as to the best methods of feeding, improving their output and increasing their profits.

Lectures, illustrated with lantern slides, are given over Southern Ohio, Northern Kentucky and Western Indiana. These lectures have been attended by thousands of milk producers. As an example of their practical value, one

*Annual report for 1913 now complete; average bacterial count for 1913, 460,000.

large dairyman has decreased his herd from 450 cows in 1912 to 340 in 1913, and is producing more milk with the smaller herd.

It was recognized early that the fullest efficiency could not be attained on a part-time service, and that only educated men should be appointed as inspectors. For these reasons, full-time service is the inflexible rule, and graduates in veterinary medicine are alone eligible for appointment, which is made through the civil service after a competitive examination.

A few lines, showing the number of inspections and laboratory examinations before and after its adoption, will demonstrate the value of full-time service.

In 1910, on part time, 1,636 dairy inspections, 73 milk depot inspections, and 244 inspections of stores where milk was sold were made. In 1911, 5,863 dairy, 815 milk depot, and 9,150 store inspections were made. In 1912, 10,379 dairy, 1,960 milk depot and 7,150 store inspections were made.

Full-time service for the chemist, which was inaugurated at the same time, shows similar results.

In 1910, 3,769 chemical and 255 bacteriological milk examinations were made. In 1911, 8,256 chemical and 1,487 bacteriological milk examinations were made. In 1912, 8,827 chemical and 1,750 bacteriological milk examinations were made. Presumptive tests for the colon bacillus were made in 560 samples during 1912, and a positive result obtained in 56 per cent of the one-to-a-hundred dilutions.

We have a regulation requiring the use of the covered milk pail; another giving authority to confiscate milk showing sediment in the bottom of the container; others specifying how barns and milk houses shall be constructed, and another requiring all milk to be pasteurized that is not drawn from tuberculin-tested herds. The holding system is employed, the regulations calling for a temperature of 145° for thirty minutes.

These regulations are being enforced. The government score card is used for scoring.

Several hundred new barns and almost a thousand new milk houses have been constructed in the past three years.

In the matter of high dairy scores, Indiana leads with almost an even 100 per cent of its dairies in Class A, which means that they score 60 or better on the government score card.

Kentucky comes next with about 80 per cent in Class A, while Ohio is third with about 70 per cent in the same class.

One effect of raising our standard has been to reduce the price of production. Many dairies with a limited number of cows have found it to be better business to combine dairy routes under one management, and have bottle sterilizers, bottle fillers and pasteurizers under one roof instead of anywhere from one to a dozen or more. This has reduced the cost of equipment and distribution enormously and made it possible to sell at the old prices and still realize a profit.

Four thousand gallons of our milk is from tuberculin-tested cows. With the completion of pasteurizing apparatus now in process of construction, the other 27,000 gallons will be pasteurized. Most of these 27,000 gallons are being pasteurized at present, but some plants have not yet been finished.

By January 1, 1915, all of Cincinnati's milk will be from tuberculin tested herds, a law having been passed which will require the test for all dairy cattle shipped into the State. For years Cincinnati has been a dumping ground for tuberculous cattle from other states. Whether or not this is an important causative factor in her high tuberculosis death rate remains to be demonstrated, but there are many who believe that it has been a very potent one

THE SANITARY MILK SURVEYS IN KENTUCKY—SOME FACTS, METHODS AND RESULTS.*

By R. M. Allen,
Lexington, Ky.
Head of Kentucky Food and Drug Department; President American Pure Food League.

The pure milk work of the country has reached a point of agreement as to facts and methods. It has reached that further point where the dairymen and the milk trade, of themselves, are demonstrating the equipment and method necessary to the production and sale of clean milk. The work before us, while still in need of investigation, is more in need of demonstration and application. The states need better systems of milk legislation, including more opportunity for constructive administration. The majority of the cities and towns need better milk control ordinances and the laboratory and trained field force necessary to keep in constant and helpful touch with the city milk supply. The city health officers themselves, in most instances, need to be educated in the essentials of constructive and effective methods. While there are some minor questions concerning which we differ, all are agreed that bacteriological and chemical laboratories, veterinary science, medical inspection of employes and a thorough knowledge of the practical equipment and method necessary to produce and protect pure milk are the fundamental administrative requisites.

Let me emphasize the necessity for constructive and helpful administrative methods and for a thorough knowledge of the practical items of equipment and method which the dairymen and the milk trade need. When the bacteriological count of the milk, as delivered in the market, has been made, or when the dairy has been inspected and criticised, the work is but half done. It is necessary to follow the examination of the milk sample into the dairy and demonstrate to the dairyman just what particular practices or omissions are responsible for high counts, how to remedy these, and how to do it at the least cost. This is the present plan of work in Kentucky under the state pure food law, and, while the milk supply of the state is by no means perfect, substantial and increasingly good results can be shown in almost every section of the state.

The chemical examination of milk has been supplemented by sanitary inspections and bacteriological examinations. The dairymen already knew from experience that clean conditions and icing would keep the milk from spoiling. Some of them knew, from use, that formaldehyde could accomplish the same results. The pure food laws took formaldehyde away from the careless and the unclean. The experts undertook to find out the number and kinds of bacteria in milk and the sources. Milk from the teats and udders of cows was examined. There was some dispute as to whether the milk from the udder was or was not sterile. Finally it was agreed, barring germs from diseased udders, that the milk comes from the udder, for all practical purposes, in a sterile condition, and is contaminated in the barn, by the milker, in unclean utensils and so on. Agricultural bacteriologists, working in the interest of the dairy industry, made the majority of the inquiries of this character. All science is related. Pasteur, working on anthrax in sheep, laid the foundation of preventive medicine.

Prof. Russell, now director of the Wisconsin Experiment Station; Prof. H. W. Conn, bacteriologist of the Storrs, Conn., Station; Prof. Hunsiker, of Cornell University, were among those who studied the bacteriological problem from the cow's teat through into the market, helped to classify several hundred kinds of bacteria, to show that clean condi-

*Read in Section on Hygiene and Preventive Medicine of Southern Medical Association, seventh annual meeting, Lexington, Ky., November 17-20, 1913.

tions and clean production of the milk insure a low count, and that reverse conditions always show a high count.

Accompanying bacteriological investigations, such men as Prof. Pearson, who started with the Dairy Division of the United States Department of Agriculture, was later Professor of Dairying at Cornell University, and now President of Iowa State College, made a study of the equipment and method necessary in the dairy for the production of sanitary milk. Inquiries were made by the Federal Dairy Division into the market milk supplies of cities. Health officers, such as Dr. Woodward, of Washington, D. C., undertook systematic studies, and finally, in 1906, all the experts of the Federal Government were brought together by the United States Public Health and Marine Hospital Service to colaborate the practical and scientific facts with relation to the milk supply and its proper control. Thus it was that a fund of accurate and important information was established which, while still leaving many important problems for investigation, was extensive, accurate and practical enough to revolutionize the sanitary condition of the dairy business, when the educational effort and enforcement of the law should put the information into the hands of the health officer, the dairymen and the milk trade, and require every-day compliance. The Kentucky pure food work is trying to obtain such results.

Up until 1904 effort under the pure food law of Kentucky was directed towards eliminating water, artificial coloring, skimming and preservatives like formaldehyde and boracic acid. Comparative results show the elimination annually of over five hundred thousand dollars' worth of water from the state's milk supply. There were several statutes against contaminated milk, the enforcement of which was not lodged in any particular officials. The evils of the slop dairy were extensive and dangerous, especially in and around Louisville. For several years the health officer had been fighting to have these closed. Dairymen, out on the farms, made assessments to help, and employed counsel; cheap swill milk being a competition which they could not easily meet. The slop dairies were really for the purpose of fattening worn-out and diseased cows shipped from the farms into the stockyards, with milk as a by-product. Cows, chained like the goose, were fattened and milked in filth. Finally the health officer secured indictments. A case was taken to the Court of Appeals and on December 9, 1903, Chief Justice Burnam sustained the old statute of the state against the sale of milk from cows fed on slop or liquid distillery waste. With this backing the health department renewed another year of attack. Attorneys for the dairymen, however, raised a new point. They contended that the swill statute had been repealed by the later pure food act, because the later act applied to all foods and particularly to the sanitary conditions of foods. The lower court so held. The question was, had the Legislature intended by the pure food statute to repeal the protection of the former law, or had it intended to supply a new remedy in the pure food law.

Physicians, consumers and the health officer in Louisville appealed to the pure food workers at the Experiment Station, and we decided to meet the new point which the dairymen had raised with another point that if the Legislature had repealed one statute, it had intended to cover the subject in the later act. It was necessary to reinvestigate unsanitary conditions because the new law would apply to the filthy conditions and not the feeding of the slop. The dairymen claimed that the slop could be fed without filth. Several dairies were designated for the experiment. The result continued to be unclean and unsatisfactory conditions, with which human labor could not successfully deal. The dairymen were notified in the spring of 1906 that after the cows were sold their business must not be started again in the fall. The majority of the distillers furnish slop only in the cooler seasons. Without exception the dairymen again

opened in the fall. Without exception they were brought before that honest official, Magistrate Hollis, as stubborn in the enforcement of the law as were the dairymen in its violation. Large fines and jail sentences were imposed. The jail sentences were held up for several months to allow the dairymen to dispose of their property. April 1, 1907, was set as the date to end slop feeding. As the date approached, pleas and pressure from almost every part of the state were brought to bear in behalf of the continuance of the practice. The county attorney, the health officer, the magistrate, the committees from the consumers' clubs, the physicians and the Louisville press stood pat behind us. Swill dairying, as an established industry, was forever abolished from the state of Kentucky and a precedent established for the country at large.

We continued the sanitary inspection of dairies out into the farm districts. Milk depots, retailers' ice boxes, shipping cans were looked into and many cases prosecuted. The sanitary equipment and method in practically all the dairies of the state were several times surveyed. New barns, new milk houses and awakened interest in sanitary milk production followed. Finally, the department secured funds to utilize the accurate methods of bacteriology. A traveling laboratory was put into the field for the purpose of showing local health departments, consumers, dairymen themselves, just how the work was done. Once, twice, three times the milk supply of the whole state was gathered for bacteriological investigation, and the problem in each city studied. Some of the dairymen, with the conservative information published by some bacteriologists, argued that the high counts did not mean bad bacteria. To all present-day workers high counts mean careless and unclean conditions. The task, therefore, is to convince the dairymen; and, so, during the past two years we have not only been making general counts of the number of bacteria in the milk, but have also been centering on one particular class of bacteria, namely, those of the B. coli group, bacteria which originally come from manure. A dairyman in Lexington, supplying one of the hospitals, had a general count of 3,000,000 and 50,000 bacteria of the B. coli group per teaspoonful of milk. We took the sample box out to his dairy, took samples of manure dust from the barn floor, washings from the cows' udders, a section of the strainer rag from the can. This showed him where the B. coli bacteria came from and how these and other bacteria came into his milk, from unclean conditions during milking and the filling of the can in the barn. He corrected conditions, put down a concrete floor, washed the cows' udders, installed a sterilizer for utensils and used covered pails, and his count dropped to within several thousand and the B. coli disappeared. This is mentioned to illustrate the particular character of pure milk work now in progress in Kentucky.

It is urged that individual herd tests, as a basis for determining the chemical standard of milk, are impossible in connection with the milk supply of a large city. It *is* impossible to that method of city inspection which has not yet divided the milk supply up into its trade units, and which is not following close enough to the source to have a record of the actual condition of each dairy. When milk inspection is conducted with sufficient intelligent force and system, it is easily possible, within a few years, to group and list those dairymen given to watering their milk; and with such herd standards it is easily possible to know whether the city dealer is delivering milk of the same standard as it comes from the dairies.

Not only are locality and herd standards necessary, to preserve the purity of the milk as it comes from the cow, but they are further necessary to do justice to the dairyman. It is true that laws have required that milk shall come up to a certain standard; that milk given by a herd which does not come up to the standard has been forbidden sale without

proper labeling; and that the courts have sustained such action. Ordinarily, an analyst would report a milk analyzing 2.2 per cent butter fat and 7.69 per cent solids not fat as being badly watered, following thereby the legal standard, and convictions on such low results are always easy. There is no question but that such milk is below the standard, but prosecution on the grounds of its being below the standard is one thing, while charging the addition of water is another. A case in point, in this connection, arose in the prosecution by the Department of Agriculture, based on a sample of milk shipped by a Kentucky dairy firm, through interstate commerce, into Cincinnati. The Federal analyses showed results of about 3.0 per cent fat and about 7.88 per cent solids not fat. Several samples showing such results were taken by the inspector. The dairy firm in question appealed to the Kentucky pure food department to investigate the quality of the milk being produced by their herd. They were charged with watering. They knew that they had not been guilty of watering, but wanted to find out as to how the water came into the milk, or as to whether their Holstein herd was producing milk above the results of the Governemnt analyses. We telephoned to Cincinnati for the analyses. We told the dairymen that the Government's results, in our opinion, clearly indicated added water, and that we did not believe that a herd test would do them much good. We sent an inspector to make a herd test of each individual cow, however. The results of these individual cow tests ranged from 2.2 per cent fat and 7.69 per cent solids not fat to 3.6 per cent fat and 8.48 per cent solids not fat. In only ten instances were the solids not fat above 8 per cent. The average for the herd showed fats 3.09 per cent, solids not fat 7.79 per cent. In this connection we have found convictions very easy in every case where we have been able to show the herd standard. In one case we were able to secure a jury conviction where the untampered-with milk, as delivered on the market, showed fats 4.6 per cent, solids not fat 8.46 per cent, and where a herd test showed a fat average of over 5 per cent and solids not fat of over 8.8 per cent.

Very favorable results can be shown by comparing the counts in cities. In September, 1911, the average count for Bowling Green, for the first bacteriological examination, and after several inspections on the score card, was about 200,000 bacteria per cubic centimeter, ranging from 10,000 to 700,000, with practically all of the counts above 100,000. In 1913, the average count was about 50,000. The bacteriological examination of Lexington's milk supply for the first time, in 1911, for the month of April, showed an average of over 300,000. The bacteriological average for the month of April, 1913, a result accomplished through close co-operation between the city bacteriological and the State Department, and the city and state inspection forces, was 25,218.

Referring once again, for illustration, to results accomplished in demonstrating to the dairymen the cause of high milk counts, in one of the largest dairies of the state, in its endeavor to get on the certified basis, we found the counts of the milk, as sold on the market, raggedly ranging between 1,600 and 508,000. We started at the barn and took samples at each point of the process from the pails clear on through to the bottle. The bottles, cans and buckets that were ready for receiving the milk were examined to determine efficiency of sterilization. The milk was leaving the barn under an average of 1,000. The ragged variance in count was picked up in the receiving loft of the milk room, through a long and closed pipe leading from the cooler to the bottler, and in the bottler. One interesting point was that the milk coming through the pipe and from the bottling machine at the end of milking showed a lower count than in the beginning. Both the dairy department of the College of Agriculture and the research department of the Experiment Station have also been making studies of this dairy and today the count is

running regularly, day in and day out, under an average of 5,000, a record which few dairies constantly achieve.

Studies have been made in city milk depots showing the efficiency and inefficiency of pasteurizing methods. In Cincinnati depots, supplying milk to Kentucky, we found that while milk, counting many millions, with many thousand bacteria of the B. coli group, was, by the holding system, reduced below 25,000, the count was considerably increased in the long pipe system between the pasteurizer and the bottler. In Louisville, milk from the receiving tank of the dealer showed counts ranging from 6,000,000 to 17,000,000, the B. coli counts from 23,000 to 45,000. Such milk left the holder at from 5,000 to 10,000. It increased from 55,000 to 80,000 on the cooler, and from 115,000 to 210,000 on the bottling machine. In connection with studies in these Louisville plants, Dr. Pinnell and Mr. Worthington are now engaged in the bacteriological examination of milk from several dairy farms coming into the depots. Our plan is to examine the dairy and its processes, to start with, to recommend the changes necessary, and to see with just how low a count it is practicable to send milk into the city, in shipping cans. We selected the winter months for such experiments in order to clearly emphasize the part which insanitary conditions play in high milk counts. We are to have the close co-operation of the depots in this work.

The Endo presumptive test for counting the B. coli bacteria was temporarily adopted and it is now in general use, checked by other tests. This test has not been regarded with favor by many bacteriologists, probably because of the exacting technique in connection with preparing and standardizing the media, and because bacteria other than the B. coli grow on the plate. When the media is correct, and the plate incubated for not longer than twenty-four hours, the bronze-red B. coli colony is unmistakable. In connection with this test, Dr. Pinnell has made confirmatory tests in connection with a large number of the typical colonies with but very few negative results. The large volume of samples gives these and the other tests the check which comes from known conditions. In milk from the certified, and other sanitary dairies, the plate seldom shows the typical B. coli colonies, and then only in small numbers. The high counting milks, however, from the ordinary milk supplies, show a range of from 5,000 to 100,000 of these colonies. Samples of manure dust and washings from cows' udders show the typical colonies too thick to count. As a result of our experience with this presumptive test during two years' work and in connection with several thousand samples of milk, besides samples of water and other foodstuffs, Kentucky recommends the test as an excellent method for counitng the B. coli group, and thus demonstrating to the dairymen the existence and the number of this particular kind of bacteria in the milk.

After two years of constant experience, Dr. Pinnell, bacteriologist for the department, states:

"The central problem in sanitary water analysis at present is the recognition, in the presence of other groups, of the colon group of bacteria, by methods which must be fairly rapid and which also give some approximation of the numbers of colon bacilli present. So with the bacteriological examination of milk; while the colon bacilli do not mean the same as when found in water, they are assuredly an indicator of conditions under which the milk is produced.

"For making presumptive determinations I believe that there is no method as good as the use of Endo media. Endo media is nutrient agar (formula modified only as to the amount of meat extract used) with lactose, fuchsin and sodium sulphite added when ready for use. Plates are made and incubated twenty-four hours at 37 degrees C. The B. coli colonies are noted as being a very dark red and possessed of a distinct sheen. Typhoid bacteria appear on this media as a pink growth. For milk, usually 1-10 cc. of a 1-100 dilution

is plated, representing 1-1000, and with the dilution used it is easy enough to calculate the approximate number of B. coli in the product under examination.

"This, of course, is a presumptive test, but during a series of experiments some one hundred or more typical colon-like colonies were identified and proved to belong to the B. coli group.

"In Bulletin 78, Hygienic Laboratory, Public Health and Marine Hospital Service of the United States, report is given of a series of experiments in which more than 96 per cent of the red colon-like colonies of Endo's media were identified and proved to be B. coli. In an interview with Dr. J. J. Kinyoun, for a number of years with the United States Public Health and Marine Hospital Service, and temporarily detailed to the Health Department of the City of Washington, he stated that he considered the test so satisfactory and positive that a colony giving the typical characteristics needed no further identification. I know of only one objection to the use of Endo's media, and that is to obtain uniform results requires considerable care and experience in its preparation.

"Of its advantages in determining the relative number of B. coli, perhaps none is of greater benefit in that plates of Endo's media are less likely to be overgrown by spreading colonies. I have frequently seen plates out of the incubator at the end of twenty-four hours, the time when ready to count, showing the growth of no colonies at all, or only those typical of the B. coli group."

Through the co-operative work in progress between the Lexington Board of Health and the pure food department we hope to work out a model plan for city milk inspection. A year or more was spent by the committee in drafting a model health code. The dairymen showed considerable opposition to the section applying to milk. We sought a conference with them, and the result was a better ordinance in some particulars and the introduction of an experiment with respect to the tuberculin test which we would probably not recommend for a city the size of Louisville or Cincinnati. The method in general, however, would be an excellent beginning for any city in undertaking work of this kind. The monthly publication of bacteriological counts on a comparative chart, originally designed by one of the Lexington newspaper men, Mr. Fred T. Ballard, has been one of the compelling levers in producing the low average of the sixty or more dairies supplying Lexington. While this publication method has produced excellent results from this standpoint, it is nevertheless in the experimental stage. The problem is to make the chart fair. If A, B, C and D are competing for the top line, and if two samples are taken from A and six from B, B's average is likely to be higher than A's. On the other hand, where one sample is taken it is possible for a dairyman to know that the sample taken is in progress, and that when pints are being taken, to use such caution and to succeed in putting across a low-counting sample and not representative of the general market conditions. In connection with the dairies competing for the top price, at least five or six samples should be taken at various times during the month. With respect to the other dairies, the milk should be sampled at least twice during the month. In a city the size of Lexington such method of publicity takes the place of the bacterilogical standard. Such method would probably be impracticable in connection with the larger cities where the dairies run into the hundreds and thousands. In such cities the standard for equipment and method and the final standard for bacteriological count must be maintained. It is the bacteriological standard more than anything else which has developed the certified dairy, and the method which has produced such results in one case can certainly produce such results for the general milk supply whenever it is possible to obtain the legal backing. Undoubtedly the time has come to establish bacteriological standards, provided, of course, that such

standards are enforced with good sense, and provided that the administration is conducted so as to follow high counts into the depots or the dairies for the purpose of finding out and demonstrating the reasons.

Public health differs from professional medicine in that the different lines of trade, the dairyman, the baker, the grocer, the restaurant-keeper, the school teacher, and the general public must be taught the every-day essentials of preventive medicine, how to diagnose insanitary conditions, and how to provide immediate and effective remedies. Public health means that all connected with the general public must be taught in these matters, and we will not have public health until the public interest and understanding have been brought to such a basis. The time has come to change the past system of enacting very general health laws and empowering boards to adopt health regulations, to the enactment, into a statute or an ordinance, of more specific regulations. It may take a year or two years of persistent effort to convince a city council or state legislature that such regulations are necessary, but when these legislative bodies have been convinced, together with the attendant public interest and public support, a large and most difficult part of the work has been accomplished. I do not mean that the health boards should not be left with full power to meet any and all health contingencies, or to exercise the broad powers which the legislatures and the courts have recognized as being necessary in connection with their work, but my point is that we will never have every-day public health until the public have been interested and educated in the every-day necessities of public health. The time will come when the health officers of the country should be chosen because of their particular training for public health work. Such training should include a knowledge of chemistry, sanitary bacteriology and sanitary engineering. In many cities and towns of the country the health officer is the only official connected with the health work, and it is highly necessary that such official should have the equipment and knowledge necessary to make every-day tests of water and milk. If we are to have men so trained, the time has come for our universities to organize colleges of public health. There may be a question as to how many colleges of medicine should exist within certain sections of the country, but there is absolutely no question but that every state university should maintain a source of instruction designed not only to fit men to enter the public health service of the states and cities, to make good milk inspectors, meat inspectors, sanitary engineers, men especially taught how to deal with infectious and contagious diseases, and at the same time to prepare students to undertake the every-day practical side of sanitary methods in connection with the industries themselves. We need to introduce more of sanitation into the dairy courses of the agricultural colleges and to bring all of such forces in the state into closer relations and co-operation. Behind all of these things is the need for more solidarity of public sentiment and more co-operation of all engaged in the general purpose behind definite programs. Already the country is spending a large amount of money in public health work. The proposition is to systematize and organize these expenditures. It should be possible to take a five-hundred-dollar salary paid to one man, six hundred to another, one thousand to another, two hundred to another, and so on, in the community, and provide for two or three individuals specially trained for the public health service. There should be a co-opreative understanding between the various departments and institutions of the state, having to do with public health work, as to a systematic division. Much of the antagonism which comes from the trade is due to a multiplicity of rules and duplication of inspection and a cross purpose pulling and twisting which comes from individuals of different departments working out of harmony upon the same problem. It is very easy for one department, which has a matter in sole charge,

to outline a definite and constructive policy and follow it to an excellent conclusion. We have been working to establish such a spirit of co-operation in Kentucky, and the establishment of co-operative effort has been one of the main reasons for the results which we can now claim for our work.

Let me re-emphasize the necessity for constructive administrative methods. Let the health officer put himself in the place of the dairyman and think as to how he would feel should a gruff dairyman come into his office complaining of insanitary conditions and immediately advertising the facts to the general public. The public have a right to demand that the trade shall submit to health regulations; the trade, on the other hand, have the right to demand that the regulations shall be administered only by those who have thoroughly investigated the problems and who are in a position to help in the establishment of the equipment and method necessary to overcome conditions that must be complained of.

I would emphasize again the need of building up the local health work throughout the nation. We have heard a good deal of the necessity for a national health department. In my judgment the establishment of an interstate health commission would give a long-needed backing and direction to the public health work of the country and afford a better means for investigations. The general public need to know that the Federal Government has no power to order the cleaning up of insanitary conditions in a city in the same way as they ordered the cleaning up of conditions in Panama, and that such order and the means necessary to carry it into effect must finally come from the public sentiment and the voters in each particular locality. Already the public have a much wider appreciation of public health needs and benefits. Through constant and constructive public health work we are going to make the cities healthier and happier. We are going to give a greater dignity, interest and pleasure to all of the food vocations. The efficiency of labor will be increased and the greatest of all elements of public wealth, the health of the individual, will contribute its uncountable millions to the conservation assets which are already accruing to the nation, the state, the city and the individual.

DISCUSSION.

(Papers of Drs. Evans, Landis and Allen.)

Dr. William Litterer, Nashville, Tenn.—I am a great believer in the pasteurization of milk, as emphasized by Dr. Evans. The argument has been used against the pasteurization of milk, that it is resorted to as a means of covering up filth. This can be obviated by rigid inspection of the dairies. This should include the looking out for the "carrier" state, whether directly or indirectly connected with the dairy. Certified milk is all right, but one can conceive where even this milk can become contaminated by a typhoid carrier working in a dairy. I have in mind one instance in which a carrier simply living on the place, and having nothing whatsoever to do with the milk supply, had contaminated said milk, with the result that twenty-seven persons contracted typhoid fever in a very short time, four deaths resulting. This occurred in Nashville in one of the best conducted dairies in the vicinity. The sanitary surroundings and water supply were excellent. Screens were used and the best people in Nashville consumed the milk. We have a system in Nashville by which a record of all dairies is kept. Where there are several cases of typhoid occurring from the same milk supply, then immediately that dairy is inspected.

I can relate another instance which occurred about two years ago in a female college at Athens, Ala., in which a carrier had contaminated the milk, with the result that 78 of the pupils in that school came down with typhoid fever. The dairy was a private one, hygienically kept, properly screened, and with an excellent water supply. The carrier in question was one of the walking typhoid type. The individual had been indisposed for several weeks. Would lay off from work every few days, and when he felt better would occasionally help to milk. It was in this way that the milk was contaminated. His blood showed a 1 to 100 Widal, and typhoid bacilli were demonstrated in his stools. This is an instance in which the milk would not be safe even if it were certified. Pasteurization would, however, be effective in such a case.

Dr. V. H. Bassett, Savannah, Ga.—I would like to speak in reference to one point that came up this morning concerning the recommendation in this report. I am fully in accord with it in every respect, and especially in this respect—that routine bacteriologic examinations of milk should be used to control the methods employed. It is impossible, especially in the large cities, where dairies are at a distance, to maintain a corps of inspectors sufficiently large to visit them at frequent periods, on account of the expense. It is possible, however, to examine at frequent intervals by bacteriological methods samples of

milk from every dairy supplying the city. This may seem expensive, but the expense is not so great as that of inspection. It is only a small proportion of the expense which would be incurred by adequate inspection. It does not mean you can give up inspection, but that the work must be largely of an educational nature. The control of method is by the bacteriologic test.

I would like to ask each gentleman who read a paper and the others to submit a statement as to how many bacteriologic tests in cities about the size of Lexington, and in cities of 100,000 or 500,000 inhabitants, would be required in order to make adequate control of method? It may be conceded also that there is an inspection service which is maintained to a great degree of efficiency for educational purposes. I have my ideas on this line, and I believe that at the present time there are very few boards of health, either city or state, that have anywhere near adequate control of method by bacteriologic means, for the reason they have only insufficient equipment. Bacteriologic control will not cost as much as good inspection; that is, as much as adequate inspection. Therefore, I believe it is the more economic method. In a city of say 500,000 inhabitants it would require 25,000 bacteriologic examinations during the year. That would not cost as much as sending an inspector once a month to each dairy, and once a month is too long a time to intervene between the visits of the inspector, provided you desire to have a good control of method. He can inspect the equipment, but not the method in this time. Once a week the milk of every dairy should be examined.

Dr. William Krauss, Memphis.—I would like to report what a distributing plant in Memphis is doing in that respect. The present health department has made a rather energetic campaign for the purification of the milk supply, and we have a large distributing plant that gets its milk supply from probably thirty or forty milk farms, in some instances as far as forty miles from Memphis. They have already had two warnings, and according to the ordinance a third warning will mean revocation of license. The management of this distributing plant has been so sincere in its desire to obey the law, but powerless to control the supplying dairies under the existing system, that in order to avoid a third warning, which means a revocation of the license, they went into an agreement, after a consultation with the health department, that this distributing plant should employ a full time bacteriologist, designated by and entirely under the jurisdiction of the city board of health, but paid by the distributing plant, to make repeated platings of the milk that came from these supplying farms. This is a good system, and one which should be emulated in other places where there are plants sufficiently large to justify the employment of full time men to make continuous and daily platings from the milk of the milk farms supplying them. This is an important step in the right direction.

Dr. Henry Hanson, Jacksonville, Fla.—I wish to mention a few results we have had in Jacksonville before Dr. Terry secured the services of a city bacteriologist. At that time we were trying to secure some evidence showing the necessity for a bacteriologist in the health department, and he brought a number of samples to the State laboratory for bacterial counts. Out of ten samples submitted, I obtained an average of 27,000,000 to the c.c. The highest one ran to 145,000,000 to the c.c. After making daily counts from each dairy the result has been that we find now they seldom go over 200,000, or they average 200,000 or better.

Dr. William A. Evans, Chicago (closing the discussion on his part).—I want to say in reply to Dr. Allen that I agree with him; I do not thoroughly approve of everything that is in the report, and I do not think anybody who signed the report does. When a commission of 20 or 25 men goes to work on any highly technical question, it is always found there are many opinions, and the only way to get a report is to finally strike a balance between these different opinions. I dare say if any individual out of the 25 had been writing the report he would have written it somewhat differently. It comes about as near hitting the agreement as was possible. I want to suggest that any group of men, when they came to outline a report on the subject, would follow the same plan. They would have agreed on a compromise in the end, so that we would never get a report signed by a number of people that would accurately represent the opinion of each person. Every document, every conclusion, every report is a compromised report. The report does not call for the pasteurization of certified milk. When the question was up for a vote the majority of the commission voted as their opinion that all milk, including certified milk, should be pasteurized. Nevertheless the vote was a rather narrow one; the majority was not large. It was deemed advisable, all things considered, not to try to effect a compromise on this point, but let the preamble state that the majority voted in favor of pasteurization of certified milk, but the report does not recommend it. It says that certain milk and milk of the same grade as that ordinarily termed certified milk would be allowed in the market raw; that grade B milk shall be pasteurized, and so shall grade C milk.

I was very much interested in that part of the discussion that related to the publishing of the results. It is a very easy matter to publish the results, to secure newspaper space, and to secure readers where there are but few milk producers. We commonly proceed on the idea that people are interested in a bad standard of milk, while few of them are. Few in the community are interested in making a low standard milk. The question is, who is making a thoroughly standard milk? Some of the communities, a great many of them, never publish the record every week, or month, or at stated intervals. They publish those that are good as well as those that are bad. The best milk supply in the United States is not the milk supply of any large city. I think Montclair, N. J., has the best milk supply of any city in this country. In Monclair, N. J., for many years they have published at stated intervals the dairy scores and bacteriologic counts—the scores of the men who produce milk for Montclair. They have not many of them, and people

read it and patronize those who score high, and withhold their patronage in the main from those who score low. That is the best possible way of rewarding those who act right and punishing those who act wrong.

We had much discussion as to how many counts should be considered. The agreement we arrived at was that not less than four counts should be acted upon; that it was not fair to condemn a man on one high count by reason of some exceptional circumstance. How shall we proceed? Shall we examine every milk man every day for certain purposes that are desirable? In connection with the administrative work of a certain dairy, under Dr. North, they have bacteriologists who examine the milk every day. The men are scored. The score is on the blackboard. When the milk is brought in a man reads the score to his neighbor. The man who has the lowest score for a month is given a prize, and all those who keep continuously under 5,000 get a bonus. Dr. North believes it is the crux of the situation to give a bonus to the producer who produces milk with a low bacterial count. That is not always feasible.

The circumstance related by Dr. Krauss is an exceptional one. I am sure he does not mean that should be applied to all milk supplies. But here was a farm in a bad way; they had to find some way to prevent having their license revoked when a very bad report was rendered, and the exceptional method they adopted happened to be the only way. None would advocate the idea of having a dealer pay the expenses of the bacteriologic examination. These examinations should be made out of the funds raised by taxes.

Answering the question of Dr. Bassett, as well as I can, I should say it would not be necessary to examine the milk for bacteria except once a week. Once every two months is a very desirable time, and I think we could get along fairly comfortably if we take them as they run at intervals shorter than once a month. The way to do it would be, if the score form indicated a man was probably producing milk with a high bacterial count; if the records showed that his milk as it came to market was low; if the records showed that the milk had been warmed at some time between cooling and consuming; if one bacterial count had been high the thing to do would be to follow that man up closely and examine his milk every day. But if, on the other hand, we have a man whose score showed he was cleaner, whose bacterial count generally ran quite low, we could neglect the bacterial count of that man's milk and concentrate our time and attention on the other man's milk.

The question of educating farmers is of course a very difficult one. Mr. Allen hit the situation exactly. We are trying to educate a group of men and suddenly to convert them from traditional methods to new methods. It is a thing that is disappointingly slow. I do not agree with the idea he got from what Dr. Landis has said. I personally know that in and around Cincinnati they have been devoting a good deal of attention towards educating the farmer. In and around Cleveland they have spent and are spending a lot of time in trying to educate the farmer. If you remember, Dr. Allen spoke of these lectures and lantern lectures which were delivered to farmers. Then the agricultural schools are running their courses, and we are now getting the county agricultural colleges still further supplementing their courses.

I wish we could get all babies back at the breast. As you know in Germany they have been working along that line in a narrow way for a considerable time with a degree of success. I doubt if anybody seriously, under the complicated conditions of city life, has a remedy for the infant mortality situation. It would be a good deal harder to bring about that reform or change that custom than to change the milk supply. As I see it, we have, as far as our tenement house districts are concerned, to recognize that canned milk, that condensed milk, is a necessity. We have to recognize the fact that there is no other possibility, and we have to get together by systematic and intelligent study on the canned milk situation, because it is the only method of getting milk for the babies in the very worst part of our large cities. A baby at the breast is the right thing, but that cannot always be had. The closer you bring it to that the better it is. Town cows are exceedingly difficult to be had; that is, it is exceedingly difficult to get a proper supply of town cows. We have to reckon with things as they are, and the thing we are after is the cow in the country, and the baby is at the other end of the line, and between them there is a long railroad haul and a wagon haul through the streets of the city.

Dr. J. H. Landis, Cincinnati, Ohio (closing the discussion on his part).—I think Dr. Evans has probably set Dr. Allen right. The vast majority of the cases that have been prosecuted in Cincinnati have been because of adulteration. Every man engaged in this industry knows when he has added water to his milk. We have not placed a premium on a second offense by failing to prosecute for the first one.

We thoroughly agree with the idea of educating dairymen. Dr. Blume, the chief inspector, has issued a little leaflet, headed "What Are Your Cows Doing?" In this they are instructed how to proceed in improving their output and methods of feeding. It was through this method that one dairy cut the number of cows over 100, and produced more milk than it did one year before.

Outbreaks of septic sore throat have occurred in the best dairies in Chicago, Boston, and Baltimore. There is but one thing that will cut out milk-borne infections, and that is pasteurization.

Policemen are not appointed for the purpose of keeping surveillance over the law-abiding element in a community, but they are appointed for the purpose of keeping close surveillance over the crooks in a community. That is the theory we go on in taking milk samples. If we find a man is sending in milk which runs high bacterially or low chemically, we are after that man every day in the week and keep after him until he has seen the error of his way, or has gone out of business, and quite a number of them have gone out of business.

Dr. Evans has also covered the question of a bacteriologist being paid by the man whose

products he examines. That is very much like an inspector being paid by the contractor who is laying a pavement for a city. The minute the inspector fails to please the man who is paying his salary, he loses his job. I believe all of these employes should be paid by and be absolutely under the control of the health department.

UNUNITED FRACTURES.*

By Duncan Eve, M.D.,
Nashville, Tenn.

Non-union occurs too frequently, even when the fragments of the fractured bone have been maintained in an end to end position by external splints, or by an open operation and fixation by some well-known means.

The question as to the effects produced by metallic substances (for fixation) upon the tissues are not known, yet it is a fact that in many instances irritations and even infections are encountered. But Blake, of New York, claims that mild infections do not interfere with bone union, but, on the other hand, stimulate the formation of callus. No doubt the liability to infection is increased when we make an open wound and thus expose the fracture, for the tissues having been bruised and torn by the jagged ends of the bone, allow bacteria to enter unrestrained, or the bacteria are transmitted to the injured part by means of the blood current.

It will not be my purpose in this paper to discuss the various causes of non-union, but to devote my time to the consideration of some of the many methods of treatment, more particularly the means of fixation.

As a general proposition in fractures, the rapidity and completeness of the recovery are proportional to the accuracy of reduction and retention of the fragments.

In all operations for non-union, after freshening the end surfaces of the fragments it is necessary to employ some artificial means or method for holding the same in position. These substances may be chromic catgut, wire, nails, screws, bones or ivory ferrules or medullary plugs, autogenous or foreign bone grafts, staples, internal bone plates, external clamps, etc. As in every other procedure, the method must be adapted to the case itself and not the case to the method.

An ideal method would consist in the employment of something which, while holding the fragments firmly and not producing irritation of the tissues, would undergo absorption, thus leaving no foreign substance that had to be removed or cause late infection.

Unfortunatly nothing ideal has yet been discovered that experience can safely commend. At the present time the plate and clamp are most popular, although bone grafts are rapidly gaining ground.

As stated, the method must be adopted to the case, therefore in ununited fractures of the smaller bones we have found Huntington's (of San Francisco) staples or a thin small metallic plate, like Sherman's, or one that can be cut to any length, preferable to the heavy and unyielding plates of Lane. A certain elasticity in the plate or staple provides against the pulling out of the screws on account of the leverage that is exerted by the fragments. Dr. E. Martin, of Philadelphia, now uses instead of the Lane plate, one made of vanadium steel like the Sherman. Another advantage of the Sherman plate is the special tap head screws adapted to a screwdriver that makes their fixation simple and firm in less time than is required in the use of any other plate.

Huntington states that the staple he has introduced is of peculiar structure, and in this has its chief merit. In describing it he says: "It is cut with a die from a steel plate (staples made of bent wire are faulty in many respects). The finished article presents two square legs and a flattened connecting bar. The legs are not tapered, but are worked down to a rather blunt point in its lower one-eighth inch. The four sides of the square legs are sharply corrugated. Staples of several sizes are necessary, varying in length from one-half to five-eighths inches."

*Read in Section on Surgery of the Southern Medical Association, seventh annual meeting, Lexington, Ky., Nov. 17-20, 1913.

"Accurate, painstaking adjustment of the staple is imperative and may be accomplished as follows: The fragments having been nicely adjusted, a staple of proper dimensions is selected and the location of the first drill hole determined. A drill is selected appreciably smaller than the staple leg. With this, the cortex is perforated. With one leg of the staple in the aperture, the other is swung into place and made to mark, with precision, the other drill hole. Finally, each leg is placed in its proper hole, held firmly by forceps in the hands of an assistant and with a rather light hammer driven home."

We have used this staple for the past year with the most gratifying results in not only non-union cases, but in recent fractures of the smaller bones where an open operation was indicated. Our especial reason for its use is that we have the smallest possible amount of foreign material accomplishing the purposes intended.

In adjusting either a plate or staple, care should be exercised to place the same as far away from the line of incision as possible. When the foreign body lies directly under the incision, wound healing is slower and less satisfactory.

Very rarely do we resort to a drain. Wounds, carefully made with regard to hemostasis and closed with no dead spaces or cavities, need no drainage. All that is required is to thoroughly immobilize the part and enjoin absolute rest.

In non-union cases of the larger bones, especially in the shafts of the femur, tibia and humerus, experience has taught us after a trial of nearly all the usual fixation methods, to settle pretty well down to the use (when we can) of Freeman's external clamp. Would state that six years ago when we first used this clamp it was anything but satisfactory, and our conclusion was not to employ it again. We then turned to plates exclusively for a time, but we later found that many good surgeons were continuing to use the Freeman clamp and this made us willing to give it another test, for perhaps improvements made in its construction would make it more valuable. At any rate, our judgment is now quite different, for we would not be without this clamp for a great deal.

We cannot do better than quote from Dr. Freeman's description of the advantages he claims for his appliance over the internal plate as follows:

"1. It can often be more easily applied, with less manipulation of the tissues and denudation of the bone. Holes can be drilled and the screws inserted, with the fragments in almost any position. They can then be adjusted without the use of elaborate holding apparatus and the screws instantly clamped.

"2. Nothing comes in contact with the line of fracture, as does an internal plate, and the screws themselves may be placed as far away from the break as may seem desirable, even in sound, uninjured tissues. This is of much importance, because, as is well known, the presence of a foreign body favors infection. In this connection Martin says, 'As a rule the presence of a plate, instead of stimulating osteogenesis between the broken bone-ends, retards it.' The possibility of placing the screws at a distance from the fracture is also of manifest advantage in cases in which the bone is comminuted.

"3. In most instances an external clamp will immobilize the bone fragments even more firmly than an internal plate will, as may easily be demonstrated. This is because the long screws get a particularly firm grasp within the bone and the heavy external clamp holds them together with absolute security. The screws, if rigid enough, may be long without detriment, because they will be removed later, and the clamp may be heavy because it lies without the tissues. When a clamp is properly inserted, say in a fracture of the tibia or of the femur, the limb may be picked up by the foot and thrown about in any direction without fear of disturbing the fracture; but if a plate is employed this can seldom be done without danger of bending or breaking it, or of pulling the screws from the bone.

"4. The principal advantage of the external clamp, however, is that it may easily be removed at any time without the use of a general or even a local anesthetic, thus avoiding a much-dreaded secondary operation and also the necessity of leaving a foreign body in the tissues with all the disagreeable possibilities that this implies.

"Every one knows that while plates are being inserted all over the country, they are constantly being taken out, either by those who put them in or by others. If this were all it would not be so bad, but, in addition, sepsis is not infrequent, sometimes resulting in loss of limb, as I have seen, or even in loss of life. In our Denver hospitals, which, I venture to say, compare favorably with most others, many plates have been inserted, the majority of which have had to be removed for various reasons, and some of the results have been disastrous in the extreme."

The objections urged against the employment in general of external clamps are first the size and weight of the appliance and, secondly, the danger of infection. The first objection is absurd, for the size and weight of Freeman's clamp are advantages which insure security and strength. As to infection, primary or secondary, the danger is not as great as in the use of an internal plate, because, if infection occurs, it will be generally localized and can be compared to that which is noticed around sutures of silkworm-gut.

Take a certain number of ununited fractures treated by external clamps and a similar number treated by Lane's plates, and we venture the opinion there will be less infection in the former cases.

Our experience thus far is limited in the use of bone grafts—the cases we have operated on in our clinic have been gratifying in many respects and no doubt with a more intimate investigation of this method in its application to non-union cases, we might become enthusiastic.

We agree with Murphy, of Chicago, that the only bone grafts that can be used must be human, and further, that they should be taken from the same individual operated on, "for other grafts are all digested, and the element necessary is that the bone that is to regenerate this graft must have contact with osteogenetic living elements."

Bone grafts if removed from the corresponding limb of the one operated on, are better to be taken as near as possible, the same level or location of the ununited fracture. After the fibrous or cartilagous material between the fragments is removed, the medulla should be reamed out above and below the line of fracture and thus groove out a gutter or canal for the reception of the transplant (graft). The chisel is the best instrument for this purpose. If the crest of the tibia is the part involved, it can be divided with a saw at both ends of the transplant and chiseled out to fit snugly the mortised bed. It is well to fix the graft firmly and for this reason one end of same is slightly sharpened in order sometimes to be driven in the canal of one of the fragments. A deep row of sutures will close the soft parts and periosteum, covering in the wound.

Murphy describes the fate of the transplant as follows: "First, following the implantation of the bone, a blood clot forms, surrounding it. Next the blood clot becomes organized and vascularized. Then the vessels from the neighboring structures surround the transplant; finally, the vessels from the neighboring bone coming from the Haversian canals and canaliculi, pass into the Haversian canals and canaliculi of the transplant, and it is these Haversian vessels that carry with them the osteogenetic elements that produce the new bone. When the Haversian vessels in the neighborhood pass into the transplant, they first produce absorption of the margin of the canal, then they cause a deposit of bone on the vessel. Finally the Haversian canals, canaliculi and lacunae are filled with new vessels and these new vessels carry the osteoblasts, which produce the new bone."

In all cases in which union has failed from some other method first employed, it would

seem that Murphy's transplanted bone splint would be peculiarly applicable in non-union cases.

DISCUSSION.

Dr. Isidor Cohn, New Orleans, La.—Gentlemen, I do not arise to discuss the doctor's paper from the operative standpoint of un-united fractures; I simply wish to discuss one statement which the doctor made, in line with Prof. Murphy: Bone transplants must have contact with living osteogenetic centers to live and grow. This bone was transplanted into the anterior chamber of the cat's right eye, has no contact with any bone-forming substances whatever. We did not measure that bone transplant, and in growing it has taken up some of the pigment from the iris. The fragment was free of any vascular supply of its own.

Another thing which, in a way, disproves the statement that it must have bony connection, or that it must have a vascular supply of its own, is an experiment which we carried out on April 19. A subperiosteal resection of rib was done. We took the precaution to shave off the periosteum and divided it into three pieces. One piece was transplanted into omentum, one into the spleen, and one in the rectus muscle, and I can show here the living, growing bone in these particular locations. (Microscopic slides.)

Another thing of interest along these lines—two experiments: One, it may be remembered by some of you as the sponge experiment, and the other the glass tube experiment. Dr. Macewen simply took a piece of bone and transplanted it inside the sponge and wrapped the whole in omentum. When he took it out, several weeks later, spicules of bone were growing out of the sponge without any bony connection. A portion of the circumference of the shaft of bone was removed. Into this defect a glass tube was inserted.

Then we have specimens of bone grown free of periosteum: the omentum, the thyroid gland, and in the muscle. Further, we don't believe periosteum is absolutely necessary for bone growth, for as is shown, in none of these instances did we have the periosteum. We have never been able to grow bone from transplanted periosteum at all, nor have we been able to grow it from the under surface of the periosteum, which has been elevated from the bone which it was originally in contact with.

Another point which I failed to mention: It is not autogenous; it is taken from the tibia of another cat. That, we did not mean to do.

Dr. Jere Crook, Jackson, Tenn.—The subject of bone surgery is perhaps attracting more attention than any other surgical problem at the present time. The impetus which this subject has received in the last five or six years was probably given to it by Lane, at Atlantic City, a few years ago. Some of our American surgeons, I think, have advanced further along this line than any others. It has been my good fortune to see some of Dr. Murphy's bone grafting. We have all experienced the difficulty of putting in plates and having to remove them, and we know the natural antipathy which human tissues have toward foreign material, therefore we should prefer not using metals of any kind in bone surgery. So it seems to me the most notable contribution presented so far, is the bone-grafting work which Dr. Murphy has perfected.

While his theory as to the osteogenetic function of bone may not be concurred in by all of us, yet we must admit that the technique practiced by him in taking the autogenous bone graft from the tibial spine and placing it in the region where it is needed is most ingenious and successful. Indeed, it seems to me this is the ideal method of treating ununited fractures.

One point I noted in Dr. Murphy's work last week: He had taken out more of the bone-graft from the tibia than he could use, and had about one and a half inches left. He put that on the outside and sewed the tissues over this to make new bone. The Freeman external apparatus does not appeal to me. I would rather pin my faith to an internal plate of some kind—not, necessarily, a Lane plate. The main thing to do is to get the bones in perfect apposition and to be absolutely sterile in our technique. Very few of these plates will have to be removed if the asepsis is perfect and we have perfectly placed in apposition the severed bones.

Dr. J. D. Chason, Bainbridge, Ga.—This subject should not be slighted at all, because we all meet with ununited fractures. It is easy to discuss the ununited fracture, but we often have these fractures coming ununited weeks afterwards, and we don't know the cause every time. Therefore, it is necessary, in most instances, to open up the soft tissues over the bone and see what is the cause. Very often we have a fibrous tissue, muscle or membrane, or something interposing between the bones, and yet the limb will work. Often the radius is ununited after eight weeks.

There was a man who came to me in good health, and we had to remove the interposed tissues and put on a Lane plate—with perfect success.

It does not matter what you use so you do not get too near the end of the bone. Get as far away with your screws as possible, and with one screw in each end, where you have a fracture of the ulna and radius, one is amply sufficient in each plate. In fact, in the majority of cases, if you fasten the radius and leave the ulna, after you have resected the ends, you will often get a satisfactory result. In those cases, in trying to interpose the bone clamps would be very nice, but some one brings a patient to you and you want to get him fixed as quickly as possible, and I believe the bone plate is the best.

Dr. H. P. Linsz, Wheeling, W. Va.—Dr. Eve's paper is very conclusive, and shows a great deal of thought and consideration of this subject. It is very important to endeavor to ward off this condition by carefully treating and watching your fractures while they are fresh—in other words, try to unite the fragments of bone as soon as possible after they have become ununited.

I do not agree with the last speaker in regard to using Lane's bone plates in all fresh fractures. I do not believe it advisable to convert a simple fracture into a compound fracture in order to use the bone plates. Dr. Lane's technique is fault-

less and absolutely clean, and unless the operation is done strictly in accordance with his method it had better be left undone. The ordinary thumb method of surgery will not do in these cases.

I am very much in favor of the treatment of ununited fractures the doctor advocates, namely: The Freeman clamp, because while in order to insert the screws which hold the fragments of bone in apposition, you can make an open wound —your clamp is above the surface and the skin heals readily after the operation, leaving nothing to contend with when the clamp is finally removed except the small holes through which the screws passed, which close very rapidly.

I have obtained quite good results from the use of silk and silver wire. This material has been used for years and years, but no matter what material or method you may employ, the main object is to get the fragments of bone in apposition and keep them there until they unite.

My attention has been called to a method which has been practiced to some extent in Germany and France, by which, in ununited fractures six or seven weeks after the injury, the ends of the bones are vigorously and forcibly rubbed together, thereby setting up an irritation and a subsequent healing process.

Dr. Byers, Tennessee—We have heard a great deal of discussion since Mr. Lane's paper on the application of different kinds of hardware to the bones, and our surgeons took hold of it with considerable avidity, and it seems to me the more I hear of it the further they seem to be getting away from the Lane splint, and the more are they trying to substitute some other method which may or may not be better than the Lane splint. I would like to ask Dr. Eve—I do not remember what Lane said about it—at what stage should we call a fracture ununited? I have done considerable surgery for quite a number of years, and I have never had an ununited fracture. I had one that went for fourteen weeks—the longest—a fracture of the tibia. I had another one which went for probably six months, where the elbow joint was shot through, and it wasn't possible to get union of the fragments just above the joint, and we had a union of the elbow joint with a false joint above, which I regarded as an ununited fracture, and after his refusing to have a resection. This man came to me some three years afterwards and showed me a very useful arm, with the false joint, and, in fact, all the natural movements of the natural elbow.

Then, too, I have only had two deformities, I should say, out of probably 200 or 300 fractures. I have had but about two deformities that were embarrassing. The other fractures I would not call deformities.

Now, are we able to show with Lane's plates, or with any of these contrivances such a thing? Don't most of us get along with the application of splints and bandages with a reasonable functional result? I would not say what the result would show with X-ray pictures. I do not like to have pictures made, but, so far as we can tell from palpation, we have patients recovering in from four to ten weeks.

Dr. Joseph Graham, Durham, N. C.—There has been a great deal written upon the operative treatment of fractures. We have reported our successes, and I am afraid we have become too sanguine over our results. It has been stated that imperfect reduction is the cause of loss of function. On the other hand, is not an operation, in its traumatism, in adhesions resulting from infection often the cause of the loss of function? I have seen cases operated upon in which the bone united, and in which the adhesions and the locking of the tendons interfered extremely with the use of the limb. Dr. Eve's paper referred especially to the fixation of the fractures. I trust Dr. Eve will pardon my digression.

I think even more important than the technical method of fixing the fracture is the preliminary treatment of that fracture. When I have a fracture the first thing I want is a good X-ray picture. I do not think the picture essential to diagnosis. We ought to be able to diagnose almost any fracture without the X-ray, but I want an early X-ray to show exactly the displacement. Then I want to develop the mechanical means necessary to reduce that displacement. I have had my good results and bad results in operative treatment of fractures, and experience has taught me caution and this rule: To exhaust all non-operative means of reduction before advising operation, and if in each and every individual case we will study what are all the non-operative means of reducing that fracture, we will find we can reduce a great many so-called irreducible fractures. Given a case of fracture, the first thing is the X-ray examination to find out what the displacement is, and the second thing is to try reduction under anesthesia, and the next thing is another X-ray picture to see what the attempt at reduction has accomplished. If it has not been done, we should try steady, uninterrupted traction for at least two weeks. Intermittent traction will do little; steady traction will do much. Take the case of fracture of the femur in a child. Under anesthesia you cannot reduce the fracture. Put the child to bed; put the leg in full flexion and apply traction; gradully, every day, increase your weight, and, at the end of two weeks you will have no difficulty in reducing that fracture. The traction is not going to do good after a period of two weeks. Then is the time to use the knife. Don't wait until contractions and adhesions and callous formations have taken place. Just as in every other class of surgery, it is delay that makes the difficulty. The greatest difficulty in operating for fractures is approximating the ends of the bones. These difficulties can be largely overcome if we use traction steadily and operate sufficiently early when we see we are not going to secure reduction.

In regard to Dr. Eve's plates, I have had no experience with them. I think we should use a plate just as we do a catgut suture—for approximation only.

I use a small silver plate and silver screws made by a local jeweler. I have never used a Lane's plate or steel screws.

Dr. W. M. McCabe, Nashville, Tenn.—I thought Dr. Eve's paper was on ununited fractures. I heard Mr. Lane last week make the statement that his plate was never contemplated for an ununited fracture; that it was absolutely contraindicated in a condition of this kind. I saw Mr. Lane operate, and he never touched the skin or

any other part of the wound with his hands. He made one long incision down to the bone, freshened the ends of the fragments and put on his plate. He did not tie a blood vessel or use any deep sutures. The skin was approximated with clips. He cannot be responsible for the sepsis of other surgeons, and if they would follow his directions I believe they would get good results.

Dr. Wm. T. Black, Memphis, Tenn.—I have had several cases where the open treatment was used, using the Lane plate, and have in every instance, so far, had good results with no infection.

While my results have been all that could be desired, nevertheless, my technique has not been carried out as perfectly as Mr. Lane's, although I thought I was carrying out his exact technique until after seeing him perform his operation last week while visiting the Clinical Congress in Chicago.

I heard Mr. Lane read his first paper (I believe) on the open treatment of fractures, at the American Medical Association, which met in Atlantic City about six years ago, and after hearing this paper and keeping up with the subsequent literature upon the subject, and attending various clinics, I thought I was following his exact technique, but I find no one using his exact technique, so far as I have been able to observe.

I wish, like the preceding speaker, Dr. McCabe, to endorse and speak in behalf of Mr. Lane's operations. Mr. Lane, in performing the open operation for fractures, wears very heavy gloves, does not allow the nurse or any assistant to touch any of the instruments with their hands, the instruments being passed to him with forceps, and he only touching the handles of the instruments that do not enter the wound. The finger is never introduced into the wound, and not a blood vessel tied, nor any suture material used whatsoever in the operation. The fascia is not even sutured, and the skin is closed by metallic clips.

In reply to a question to Mr. Lane asking if he did not use a splint on the femur after his operation, understood him to reply, "You may use one if you want to, but it is not necessary; that he was not worried about the fracture, but the knee joint, and he commenced passive motion of the knee the next day to prevent ankylosis."

I believe that the open operation is especially indicated in fractures of the upper third of the femur, patella, olecranon process, fracture of the neck of the femur in the young and ununited fractures, with possibly a few other special cases where proper adjustment, etc., might call for the open treatment. I do not believe that the greater number of fractures call for the open operation.

In ununited fractures where the non-union is not due to lack of apposition, nor due to the interposition of fascia, the muscles, etc., between the ends of the bones, then the use of the bone graft as advised by Murphy, is the proper thing to use. In certain cases where union has failed to take place, sometimes the use of iodide of potash in the syphilitic will cause the bones to unite.

Dr. W. D. Haggard, Nashville, Tenn.—As to ununited fractures I think the plate is the greatest advance we have made. I am sure in the cases I have employed the plate it is not applicable in ununited fractures as much as the primary fractures. In the non-united fractures we have a problem of repair, and that, I think, is the thing. For instance, in an ununited fracture of the tibia I put in the sterilized plates, at the end of three months had non-union. I would call that a non-union. From the tibia, and in three months I had union. from the tibia, and in three months I had union. united fracture. I put in a peg of living bone I would call that a united fracture.

In regard to the experiments of the Secretary, I do not say it is entirely convincing, because, in the eye, it is very much like a foreign body; something like a piece of steel. There is so little blood in the anterior chamber of the eye that there is very little opportunity for new growth.

Dr. Jos. F. Gallagher, Nashville, Tenn.—I think when a case of ununited fracture presents itself we should immediately, in our mind, divide it into one of two classes. I will say, then, that ununited fractures may be divided into two classes as to the cause of the non-union. First, those in which apposition has not been obtained—either the fragments have not been drawn together or there is some interposition of tissue. Second, those in which there is no osteogenesis going on.

Now those represent two distinct classes which need two distinct methods of procedure: The one in which there has not been approximation, or in which some soft tissue has been interposed and prevented approximation. That is the class of cases that can be treated successfully by cutting down and approximating with the Lane plate, or with the Freeman plate. In other words, it is just allowing nature to carry out what it would do without operative interference if given the chance. In the second class, where there is no evidence of osteogenesis, the other should be the method of choice, namely, intermedullary bone splints.

As to the cat's eye: I am very much of the opinion of Dr. Haggard. Dr. Cohn will have to show more definitely that there is osteogenesis going on. As was pointed out, there is no active circulation here in the cat's eye, being only a capillary affair.

I am well aware there are two decided positions on bone regeneration: One of McEwen, which Dr. Cohn takes, and the other of Murphy.

Dr. Cohn—Gentlemen, I simply showed the cat. I knew that there was very little blood supply that this bone could get, but it was a thing which every one could see. Most of us are not good histologists—some of us, I should say, and therefore do not appreciate the fine details of a histological report on such specimens.

We have here specimens of bone growing in the spleen (which has a good blood supply), and in the muscles of the cat or dog, and the thyroid—supposed to have a good blood supply, and we have here the specimens (microscopic slides). According to Dr. Mann, formerly of Edinburgh and now of Tulane, he says the lacunae are so full of osteoblasts that they take the form of palisades, almost.

I simply make the statement that I believe the bone is growing in these instances, as I know it has increased in size, and that is my understanding of growth. These are autogenous, and have grown, and are showing evidences of active proliferation.

Dr. W. W. Crawford, Hattiesburg, Miss.—Without any wish to prolong this discussion, I desire

to call your attention to one point at variance with those who have spoken, and with the teachings of most surgeons of today, as to the practicability of using Lane's splints, or some other mechanical device in cases of infected compound fractures. I want to say that I have used them in several instances, and I believe that in just this class of cases the mechanical appliance finds a definite field of usefulness. I cite a case that you may fully appreciate the point I am trying to make: About a year ago I saw a young boy about 15 years of age who had the misfortune to have a freight train run over his leg about midway between the knee and the ankle. A great deal of the bone was destroyed and thrown away. On account of the septic condition it was impracticable to use the bone, but with this septic wound, with marked destruction of muscle, with just a limited blood supply, we saved his leg. We used a Lane bone splint, got a very good union, the boy is walking today, with very little lameness —only such lameness as would come from the loss of two inches of bone.

I have tried it in other cases of sepsis with equal results. If you have a septic wound, so much destruction of soft tissue as well as bone that an amputation seems the only solution to the question, try some mechanical device and give ample drainage. You will be gratified with results in many cases.

Another thing in regard to the Lane splint: It was my pleasure to see Mr. Lane in Guy's Hospital some months ago do two very bad cases—compound fracture of the femur—old cases—cases that were clean—and I understand Mr. Lane only operates on clean cases, as he could not carry out his definite and attractive technique of asepsis without a clean case to begin with.

It was interesting to me to note that every little fragment of bone was arranged around the two sections of the femur when brought into approximation. Not a portion as large as your thumb nail was lost, but all the pieces of bone were placed in apposition without any sort of fixation. They were left there with the idea that they would hasten the osteogenesis, and that you would have a very much stronger joint and a very much quicker repair.

Another thing in connection with Mr. Lane's work. He evidently expects the free blood in the region of the wound to act as an adjunct to repair. He ties no blood vessels, however profuse the hemorrhage may be. He only uses clips.

Dr. Eve closes.—Mr. Chairman, I thank the gentlemen for the discussion. It has taken a wide range. My paper was confined particularly to the plan or method relating to fixation in non-union cases—not the general idea of fixating recent fractures.

I am obliged to Dr. McCabe for the suggestion made, that Lane claimed no possible advantage that his plate could have in a non-union case. Several plans have proven very satisfactory. No question but what we got results in some few instances by non-operative means, tardy as they may have been. But the point is, what is the best plan to use in these cases of non-union? It makes no difference what the cause may be, it will not do to make an application of a metal plate.

Dr. Haggard has said, very properly, "Bone-graft" is best to employ in certain cases. We are indebted to Dr. Murphy perhaps more than to any one else for the lead he has taken in this matter, but, gentlemen, I desire to state that these "grafts" can only be used in certain bones, preferably the tibia, where they seem to be specially adapted, as they can be driven in one fragment and more or less fixated, and in a morticed bed.

Now there is nothing better that we can fall back upon than a staple for a small bone and an external clamp for a large bone that is ununited. We want something strong, something that is effective, to maintain an apposition and retention. The facts are that we don't know cases, sometimes, of delay from non-union. We are taught by our text-books that in a case of delayed union voluntary motion is more or less painful and hampered, while in non-union there is no pain and more or less free motion. We have cases we don't know, patients in which we have delayed or non-union and it requires time to clear this up. After an appreciable length of time has elapsed and we find there is non-union, then, of course, we can proceed to employ some one of the many fixation plans.

INDIGESTION AS SEEN BY THE SURGEON, WITH ILLUSTRATIVE CASE HISTORIES.*

By Dr. W. Burton Thorning,
Houston, Texas.

The subject I have selected for discussion today is as old as the history of medicine yet always new, for many of its problems are still unsolved. I regret to say that this paper will present no new ideas, and will solve no unsolved problems, but I shall attempt to show that its subject belongs to the surgeon as much as to the internist.

As the art of surgery advances, and as the living pathology of the abdomen is studied in its relation to clinical symptoms, the surgeon is assuming more and more jurisdiction over those fields of disease that formerly were considered wholly medical. Many symptoms, once regarded as expression of functional disorders, are now believed, and with good evidence, to be due to some distinct pathological change in the various viscera.

The interrelation between the various abdominal viscera is so close and complete that

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a pathologic disturbance in one organ can, and quite frequently does, manifest itself in an organ apparently quite disassociated. It would be interesting to take up those many complex associations, but I shall consider today only one broad division of symptoms, dyspepsia and indigestion, as they bear on remote, often unsuspected, slight changes in a few of the abdominal viscera, viscera that are most frequently handled by the operating surgeon, and with whose various pathologic changes he becomes more familiar than the internist or even the pathologist.

The terms "dyspepsia" and "indigestion," so vague and all-embracing, have for the most part been considered as the result or expression of functional disturbances or of neuroses. whatever that term implies. Yet I believe that a proportion, larger than at first sight would be granted by the internist, are really due to definite pathological lesions unsuspected, or even denied, up to a few years ago. To deny, on the other hand, that dietetic errors, syphilis, arteriosclerosis, fatigue and other general functional causes may produce a dyspepsia or indigestion, would be absurd on the face of it. When, however, in spite of appropriate treatment directed to the commoner functional causes, the symptoms persist, or persist in recurring, then the physician must consider the various visceral lesions that are so familiar to the surgeon, and whose elimination so readily brings a cure.

I do not believe that there is another organ in the body which has been blamed for so many things for which it was not to blame, or has received so much treatment that it did not need, as the stomach. That this statement is correct I believe you will all agree, and I believe that the principal reason why it is true lies in the fact that at the period when the most of us were in college, the knowledge of gastro-intestinal pathology was so imperfect that our instruction was inadequate. Those of us whose college days date back fifteen or twenty years, will, I think, recall that diseases of the stomach, with the exception of cancer and ulcer rotundum, were hurried through as if the least said the better, and that the usual formula for treatment was, alkalies for trouble that did not yield to acids, acids for troubles that did not yield to alkalies, and bitters promiscuously all around. I do not believe that of all the disorders which are commonly attributed to the stomach, actual disease can be demonstrated in over 15 per cent, and of these at least 10 per cent are ulcers of stomach or duodenum.

I am aware that this statement is open to criticism, and I am also aware that I may be —am almost bound to be—misinterpreted by some, therefore I should like to say right now that I do not believe in opening every belly for symptoms of indigestion. On the other hand, I do believe that there are many of these poor unfortunates, suffering from so-called nervous indigestion, dyspepsia, neurasthenia, etc., going about month after month, and year after year, drifting from one medical adviser to another, who can be cured by surgery alone.

So firmly convinced am I that this is a fact, I do not hesitate to say the attitude heretofore maintained of considering these conditions strictly medical is absolutely wrong. I believe a position diametrically opposed to this is the correct one. In other words, we should consider them as surgical cases, and guilty until proved innocent. This would mean no *more* operations than should be done now, but it would mean *earlier* operation. It would save years of suffering from chronic appendicitis, duodenal ulcer and gallstones; it would practically eliminate primary cancer of the gall bladder, and it would very materially lower our death rate from cancer of the stomach by preventing those which develop from the base of chronic gastric ulcer.

The few cases which I am reporting in this paper are not rare or in any way remarkable. I am using them to prove my contention that at least some of the cases of chronic indigestion can be cured by surgery. Furthermore, the question involved in the differential diagnosis will, I hope, prove of sufficient interest to

provoke a very free discussion, which I believe is always of more value to us than the original paper.

I have purposely omitted cases that were plainly ulcer, or cancer, or gallstones, etc.; indeed, the cases which I shall discuss are so homely and commonplace that only the diagnosis and results of treatment are in any way interesting.

Case I.

Mr. L. W. C.; age 45; farmer.

Family history negative. Personal history negative, except indigestion for many years. Used tobacco moderately, no alcohol, and denied venereal infection. Twenty years—or more—ago, he began to be troubled with sour stomach and eructations after meals; no pain, never interfered with his work and always relieved by taking soda.

This state of affairs continued, with occasional periods of relief from all symptoms—sometimes for several months—for ten or twelve years. About ten years ago he began to have pain with his attacks of sour stomach after eating, which would be relieved by lying down and drinking a pint of hot water with a teaspoonful of soda. These painful periods would subside after one or two weeks, and be followed by two to four weeks of comparative comfort. About one year ago during one of his painful attacks he vomited a large quantity of greenish fluid containing some food particles, a lot of mucous, but no blood. The pain, which at this time was very severe, seemed to go through to the back, and was greatly relieved by vomiting. He also said that at this time he had jaundice which had continued more or less ever since. Since this attack he has had very few days without pain in some degree. His vomiting spells came every few days—sometimes every day for several days in succession. So far as he knows he had never vomited blood, or passed it in his stools. His best weight ten years ago was 185 pounds, at time of examination 145. He thinks he had lost at least twenty-five pounds in the last year. He had taken much medicine, and followed all kinds of diet which had been suggested to him, but said the pain was not influenced by any particular kind of food. Bowels always regular. Appetite always good. Feels much better when keeping quiet, and had been obliged to give up work almost altogether.

Physical examination showed a man of large frame, muscular, but thin and somewhat pale. No jaundice, tongue clean, teeth good, no palpable glands, heart and lungs normal. Abdomen slightly distended, tympanitic, and moderately sensitive over epigastrium and region of gall bladder. Urine negative; blood showed hemoglobin 80 per cent, otherwise negative.

Gastric analysis after a test meal showed moderate hyperchlorhydria, no blood, considerable food stasis, and capacity 70 ounces. Guaiac test for occult blood in the stools negative.

Here, then, are the essential points in the case. A man of 45 years with indigestion for many years; epigastric pain off and on for ten years; jaundice and frequent vomiting spells for one year, during which time he had lost twenty-five pounds in weight. Physical examination showed moderate tenderness over epigastrium, pyloric obstruction, mild hyperchlorhydria, no jaundice, no blood in stomach or bowel contents.

I think we are safe in assuming at the outset that with a history like this, covering this period of years, there is an organic lesion somewhere. Several possibilities suggest themselves as the diagnosis, but a careful analysis of the symptoms fails to give us a typical picture. In view of his report of jaundice, our first thought might reasonably be gall stones with frequent obstructions of the common duct, but physical examination shows no jaundice, yet the patient thinks he is now as yellow as he has ever been, and the question arises, has he ever been jaundiced? Probably not, and this leads to the observation that many patients will claim they have had jaundice when they mean only that the skin has looked sallow and muddy. Further evidence against the diagnosis of gall stones is his statement that the pain always comes on after meals, and that it comes on gradually. The pain of gall stone colic is sudden in onset, and bears no relation to meals. Furthermore, while the pain of gall stone colic is occasionally relieved by vomiting or washing out the stomach, it is not influenced by drinking water or taking soda.

Chronic appendicitis is suggested, and might well be the cause of his trouble, as we well know that not infrequently a chronic appendix causes a spasm of the pylorus with a subsequent dilatation of the stomach with food stasis, and also a hyperchlorhydria. But again the pain bears too close a relation to meals, has never radiated downward, and he is not sensitive to deep palpation in the region of the cecum. Furthermore, to the best of his knowledge, none of his various physicians have ever found him with any fever, or any increase of his white blood cells.

Cancer of the pylorus should at least be consid-

ered, as he was in the cancer age, had lost flesh rapidly in the past year, and his preceding history might easily be one of gastric ulcer, upon which cancer has become engrafted, but the pain is too irregular in degree and not continuous enough, the vomitus contains free hydrochloric acid, no blood and no disagreeable odor, and while he has lost flesh, his appetite has remained good, he had no cachexia, nor the weakness and depression that usually accompany malignant disease of the stomach.

On the whole, while his history and symptoms were not typical of duodenal ulcer, the fact remained that it was the most probable diagnosis. He was unable to definitely fix the time when his pain came on, except that it was always after meals. In a typical duodenal ulcer history they will state that it invariably comes on in from one to three or five hours after eating. In this case one test for occult blood in the stools proved negative, but one test really proves nothing. It is only repeated tests after proper dieting that can furnish evidence that is at all convincing. His pain was relieved by vomiting, by alkalies, and even by drinking water, and this is typical of ulcer. Again the long periods of relief from all symptoms is particularly characteristic, as is also the hyperchlorhydria and the dilated stomach from pyloric obstruction.

This diagnosis was confirmed at operation when we found in the posterior wall of the duodenum a large ulcer which had extended up to the pyloric ring.

The gall bladder and ducts were normal, as was the appendix. The operation was completed by a posterior no-loop gastro-enterostomy, from which he made an uneventful recovery.

A year later he reported, perfectly well and weighing within ten pounds of his maximum.

Case II.

Mrs. J. F. N.; age 55; married.

Family history: Father died of tuberculosis at 37. Mother died from cancer of the stomach at 66. Mrs. N. was the oldest of a family of six children, all alive and well.

Personal history. At age of 12 had diphtheria with a post-diphtheritic laryngeal paralysis for months, and had never been able to articulate distinctly since. She was the mother of four children, all grown. Her labors had all been easy and normal. At 45 she had acute appendicitis with abscess, which was drained and from which she made a good recovery. Menopause at 50.

When Mrs. N. consulted me she complained of one symptom, pain in her stomach, which she had always attributed to indigestion. On further questioning, it developed that she had suffered off and on with this pain since her last pregnancy, and her youngest child was then 18 years old. She described the pain as being very annoying, but never severe enough to require morphine. Its onset occurred at all hours of the day and bore no relation to meals, although when present she had no appetite and ate but little. It occasionally began in the night and aroused her from sleep. Again after sleeping well it began immediately on arising in the morning and assuming an upright position. It always began as a dull, grumbling ache, and seemed to go clear through from "front to back." Occasionally, by lying down immediately and abstaining from all food and drink for six or eight hours, it would subside, and she would escape an attack. Ordinarily, however, in spite of anything she might do, it progressed from a grumbling ache to quite severe pain, which seemed worse under right costal arch and right shoulder blade. The second day was usually more severe than the first, on the third day it seemed to reach the climax and began to recede, and by the fifth or sixth day she was free from pain again, but weak and worn from lack of food and loss of sleep. In the beginning of the trouble—18 or 19 years ago—she would often go several months or a year at a time without an attack, but they had increased in frequency until for the last two or three years she had averaged about one a month. For the past three or four months the intervals of relief have not been longer than a week, so that she averaged then to remain in bed one week out of two.

She never vomited, or had jaundice, or chills and fever with these attacks, and had no sour stomach, but did have eructations of gas. Bowels always regular. Ten years ago weighed 180 pounds, when examined 150. Had become fearful that she might be developing cancer of the stomach, because her mother died from it.

Physical examination showed a woman who looked ten years older than her age given. Pale, sallow complexion, with an expression of weariness and anxiety. She had evidently lost flesh, but was by no means emaciated. Tongue fairly clean and teeth good. Heart and lungs normal. Abdomen showed an operation scar over site of appendix, with some tenderness on deep pressure at that point. Also tenderness over epigastrium and both right and left costal arches. No tumor mass or glands could be palpated. Pelvic examination showed a lacerated perineum and cervix, the uterus slightly prolapsed and larger than normal for a woman five years past the meno-

pause. Patella reflexes absent. Pupils equal and reacted normally to light. Blood: reds, 3,500,000; whites, 9,000; polynuclears, 70 per cent; hemoglobin, 80 per cent; urine, quantity in twenty-four hours, forty-eight ounces; acid; sp. gr., 1,016; faint trace of albumen; a few hyaline and granular casts; no blood; no pus cells. Several tests for occult blood in the stools were all negative. Gastric analysis gave normal findings. Blood pressure, 120 m. m. mercury.

A differential diagnosis in this case did not appear to me to be easy, with the above history, and physical examination giving us little if any information. It is hardly possible for anyone to bring to mind instantly all the diseases to which flesh is heir, but starting with some definite symptom, which in this case was epigastric pain, we can usually recall its principal causes. Beginning with what we considered the commonest causes, we attempted by a process of elimination to arrive at the most probable diagnosis. Constipation we could rule out at once; she had never been constipated. Any patient who has previously undergone a laparotomy, and especially if an abscess cavity has been drained, who subsequently suffers from abdominal pain, must at least be thought of as one suffering from vicious adhesions. The character and duration of the attacks of pain in this case was not unlike that of chronic incomplete obstruction of the bowels, but we should expect a distended abdomen, vomiting and constipation, which are absent, and a glance at the history sheet shows us that the trouble antedated her operation by a number of years. Chronic lead poisoning sometimes causes obscure abdominal pain, but she had no "lead line,"" no constipation, no appreciable anaemia, and the red blood cells were normal in appearance. The absence of knee jerks suggested syphilis, and the gastric crises of tabes dorsalis as a possible explanation, but she denied all knowledge of infection, had no history that could be construed as one of syphilis, no arteriosclerosis, no pupillary symptoms, in fact, nothing suggested it except the loss of the patella reflex, and that might be explained by her diphtheria. Chronic nephritis was also to be considered, but the urine was normal in amount, and while it contained a faint trace of albumen and a few casts, it was not typical of Bright's disease, and she had no increased blood pressure, no cardiac enlargement, and no headache or other uremic symptoms.

A low angina pectoris—or, as someone has referred to it—angina abdominalis, is not a rare occurrence at this patient's age, and we have learned she sometimes averted an attack by lying down, but once the attack was on the pain was not increased by exertion; she had no heart disease, and as before noted her blood pressure was only 120. Duodenal ulcer with atypical symptoms occurred to us, but she had no history of sour stomach, no vomiting, no occult blood in the stools, and the pain bore absolutely no relation to meals. Ordinarily, in duodenal ulcer, the definite relation of pain to the ingestion of food is the most clear-cut symptom present. Chronic appendicitis might account for her symptoms, but she had had an operation for appendicitis. It developed, however, that she did not know whether the appendix was removed or not, and in the hospital where the operation was performed, the record simply states that an appendiceal abscess was opened and drained. A gastric neurosis had to be ruled out, and in this instance we felt we could safely do so. Mrs. N. was one of the most phlegmatic, matter-of-fact women I had ever met; utterly devoid of imagination and apparently of nerves. Cancer of the stomach we thought of briefly, but dismisssed it as the symptoms were totally unlike it.

On the whole, while the history was far from typical, it seemed more than likely that the diagnosis should be gall stones. The pain as she described it was not characteristic of gall stone colic. It was less sharp and clear-cut, and apparently less severe than we are taught to expect, but it did come on at any and all hours irrespective of meal time. She said it seemed worse under the right costal arch, and that it went through to the back. She had never had jaundice, but we no longer wait for that symptom to make our diagnosis of gall stones.

With that diagnosis, I opened the belly by a regular gall bladder incision. The most painstaking search failed to reveal anything pathological with stomach, duodenum, gall bladder or ducts. A hand in the lower abdomen found the pelvic organs normal and very dense, firm adhesions where the appendiceal abscess had been drained. Nothing like an appendix could be made out. The question arose whether we were justified in prolonging the operation to determine the presence or absence of an appendix. In view of the fact that the patient's health had been steadily failing for some cause, and that we were agreed upon the cause as being some abdominal lesion which we had been unable to locate in either the pelvis or upper abdomen, we decided to make a search for the remains of an appendix. After a rather tedious dissection, we finally succeeded in shelling out the stump which remained, the

tip evidently having sloughed. It was about one inch in length, and at its cecal end was almost obliterated by a constriction. It did not contain a concretion, but was distended with fecal matter, and her pain was evidently caused by its peristalic efforts to expel its contents.

Her recovery was uneventful, and twenty-one months later she reported that she had suffered no recurrence, and considered herself well.

Case III.

Woman; 46; single; bookkeeper.

Family history negative. Personal history: Crippled since childhood with tuberculous hip joint. Had severe attack of typhoid fever at 30, and was in bed ten weeks. Since then has had most obstinate constipation, and for sixteen years had had no movement of the bowels without an enema, following cathartics. Had had very few days for more than ten years without some abdominal pain, but had attributed it to constipation as enemas relieved it. Had had "indigestion" and "heartburn" for many years, and for ten years had eaten no meat because it made her worse. For the past two years had had frequent attacks of severe epigastric pain, with nausea and vomiting, and burning feeling in "pit of stomach." For past three months this pain had been daily, coming on immediately after meals, lasting two to four hours—unless relieved by vomiting—accompanied by eructations offensive to taste; had lost all desire for food, lost weight and strength, and been obliged to relinquish her position. No jaundice, and had never vomited blood or passed it from the bowels.

She was a small, poorly nourished woman, and one with whom the fates had not dealt kindly. Forced from early life to be self-sustaining, she had struggled against the handicap of her physical infirmities and general health until the game was no longer worth the candle. Utter discouragement was written in every lineament of her features and expressed in her every word and act.

Physical examination showed a clean tongue, good teeth, heart and lungs normal; right hip ankylosed, double femoral hernia for which truss was worn; moderate enteroptosis, lower border of stomach two inches below level of umbilicus; both kidneys palpable and movable. One-half inch above and two inches to the right of the umbilicus was a palpable tumor, apparently about the size of a pigeon's egg. It was freely movable, and with bismuth and the fluoroscope it was easily determined that changing its position moved the stomach correspondingly. Abdomen somewhat distended and tympanitic; sensitive to deep pressure, but no especial points of tenderness. Pelvic examination was negative; menstruation ceased at 39. Gastric analysis showed total acidity very low, no free hydrochloric acid, no lactic acid, no Boas-Oppler bacilli, no sarcinae, no cancer cells, no blood. Urine negative; blood normal except a hemoglobin percentage of 75.

My diagnosis, which was concurred in by two very able internists, was cancer of the pylorus, and my advice to be operated upon accepted.

Under ether the tumor could not be felt, nevertheless, I opened the abdomen through a high rectus incision, and found the pylorus freely patulous and perfectly normal; no glands could be palpated, no disease of gall bladder or duodenum. I therefore closed this incision and made another in the median line below the umbilicus. A firm band of adhesions was discovered between the sigmoid and left broad ligament, which was tied off and divided. The appendix was then found and removal. Macroscopically, it was not grossly diseased, although its consistency seemed firmer than normal, and the mucous coat appeared to be somewhat thickened.

I submit that this is not a perfectly typical history of cancer, nor was the gastric analysis especially significant, except for the absence of hydrochloric acid. But here was a woman in the cancer age, with a palpable tumor of the pylorus, a long preceding history fairly characteristic of ulcer, who had in the past two or three months had daily attacks of pain and vomiting of food, and had rapidly lost flesh and strength.

It has been remarked—and very truly—that if our foresight was as good as our hindsight, we would be better doctors.

After the diagnosis of this case was made at operation, a return to the history sheet caused us to wonder why we had ever made a diagnosis of cancer.

Constipation, indigestion and heartburn for sixteen years, epigastric pain with nausea and vomiting for two years, which had increased until for the past three months it had become a daily occurrence, loss of weight, a palpable tumor of the pylorus, a dilated stomach with stasis of food, no blood in vomitus or feces. This was the clinical picture, and every symptom could be accounted for without considering cancer.

As I have said, her only pathological condition producing symptoms were a chronic appendicitis and an adhesion causing a kink in the sigmoid. The adhesion was very likely a legacy left from her attack of typhoid sixteen years before, as her constipation began immediately after. Constipation alone might easily have been responsible

for her indigestion and sour stomach for so many years, and we have all seen cases where a chronic appendix has caused epigastric pain with nausea and vomiting from a spasm of the pylorus. Her loss of weight and strength was due simply and solely to insufficient food, partly because of being afraid to eat, and partly because of vomiting a portion of what was ingested.

However, if the diagnosis was wrong, the results of treatment compensated for the error. She was in the hospital five weeks; when admitted she weighed 78 pounds; when discharged 92. A letter from her eighteen months later said: "I now weigh 110 pounds, which is more than ever before. I eat anything and everything I want, my appetite and digestion being excellent, and I have not taken a dose of medicine for constipation since leaving the hospital."

Case IV.

F. C. H.; age 38; lawyer.

Family history negative. Personal history negative until ten years ago, when he had a very sudden, severe attack of epigastric pain, with nausea and vomiting. A physician was called who diagnosed acute indigestion, and administered a hypodermic of morphine, which relieved him. This diagnosis seemed entirely reasonable, as he was on a hunting trip at the time, and had been indiscreet in the matter of both food and drink. He said, however, that on the following day he was jaundiced and was obliged to remain in camp for several days on account of soreness over the epigastrium, and general muscular weakness. He had no chills, but thinks he had some fever. After this he remained well for three years, when he had another seizure very similar to the first, but this time without any known contributing cause, and without jaundice. This time a diagnosis of gallstone colic was made, and he again recovered. Since then he had had no severe colics, but had suffered much from acid dyspepsia. About one-half hour after eating he would begin to have eructations of gas, and a burning feeling in his stomach, with occasionally some regurgitation of sour fluid mixed with food particles, but no sense of nausea and no vomiting. A feeling of great discomfort from the bloating would persist for from one to three hours, depending on the variety and quantity of food ingested. When his stomach became empty he would be entirely comfortable until after his next meal. Bowels always constipated.

This condition of affairs had existed for seven years, during which time his weight had become reduced from 180 to 135 pounds, and his nervous system had become a wreck. He had been the rounds of the gastro-enterologists, the neurologists, the surgeons—myself included—the hot springs, the seashore, the mountains, and I believe tried Christian Science. The gastro-enterologists invariably diagnosed hyperchlorhydria, and gave alkalies; the neurologists found a hypersensitive nervous system and prescribed bromides; the surgeons found nothing. My advice to him was to run along and forget it.

This man was a personal friend whom I had known for many years. A very intense, nervous, high-strung individual, a glutton for the hard and exacting work of his profession, an incessant smoker of black, strong cigars, and a drinker of more whisky than I thought was wise for him. His nervous symptoms had increased. He had spells of depression amounting almost to a melancholia, and again when his temper was most irascible. Periods of insomnia added to his troubles, when he would drink still more whisky. He had become a terror to witnesses and his associates in court, the despair of his friends, and a source of constant anxiety to his wife.

Such was his condition when he again consulted me, demanding that something be done for him.

Physical examination was not illuminating. A tall, spare man with flabby muscles, and a pale, sallow complexion. Abdomen was negative, as was heart, lungs, urine and blood. Gastric analysis showed a hyperchlorhydria and considerable food stasis, otherwise not suggestive. A dozen, or perhaps twenty guaiac tests for blood in the stools were negative.

For years I had looked upon this man as a pronounced neurasthenic, whose methods of work and manner of living made any treatment for his trouble exceedingly difficult. He had come to a realization of the gravity of his situation, however, and at my earnest solicitation he consented to give up tobacco and alcohol, drop all business cares and worries, and retire to his farm for a period of six months. He returned at the expiration of three months with his nervous condition very much improved, and a gain of several pounds in weight, but with his same old disturbance of digestion. He had believed himself to be suffering from gallstones, and was provoked beyond measure because no one of his many consultants would agree with that opinion. That diagnosis had once been made, and he claimed to have been jaundiced upon one occasion. But no physcian had ever seen him with jaundice, and while it is quite true that gallstones may exist without jaundice, it is equally true that one may have jaundice without gallstones, so in our attempt at a differential diagnosis, its ques-

tionable presence, or probable absence, bore but little weight.

Briefly, then, this man's symptoms were simply sour stomach, discomfort from flatulence, nervousness and a loss in weight. They seemed to me too few and too indistinct to enable us to make a diagnosis of any organic lesion. It did not look like a picture of ulcer, or cancer, or chronic appendicitis, but there is a late stage of gall bladder disease when chronic, gastric symptoms predominate, which we could not exclude with certainty, and while his previous history was far from being typical, we finally decided that the diagnosis must lie between chronic gall bladder disease and a gastric neurosis, which I had always believed it to be.

After carefully considering the matter upon his return from his vacation, especially as he was so insistent upon it, I decided that an exploratory operation was justifiable. Accordingly, I opened the belly through a mid-rectus incision. The appendix was easily brought up into view and found normal. The gall bladder and ducts were normal. The stomach was slightly dilated, otherwise normal. The only pathological condition present was an adhesion between the under surface of the liver and the duodenum. This adhesion was fan shaped, its attachment to the liver being about two inches wide and about three-fourths of an inch where it was attached to the duodenum, about one inch from the pylorus.

It was divided and the abdomen closed.

I was exceedingly skeptical about results, as the duodenum was only slightly displaced, with no kinking apparent, but two days after operation he announced that he felt better than he had for seven years, and he has remained in perfect health since with never a symptom referable to his digestive tract.

It would seem that a severe reproach would not be undeserved for allowing this man to suffer so many years with no diagnosis being made—consequently no treatment—but I have found, and I am sure I am not alone, that a diagnosis between some slight organic lesion and a purely neurasthenic condition is fully as difficult and requires quite as much discrimination as any question that can arise in making our differential diagnoses of diseases of the digestive tract.

It will be quite apparent from this paper that I am arguing from the surgical side of this question, and that I am optomistic in regard to surgical treatment. It is my desire, however, to be considered a conservative optomist, and this last case will perhaps illustrate my position in the matter.

It is not so very many years ago that we were deliberately subjecting the worst types of gastric neurotics to a gastro-enterostomy to demonstrate whether the symptoms were merely secondary to improper drainage alone, or whether there were some other unknown but discoverable causes. At this date it is superfluous to say that the true neurasthenic with incidental digestive symptoms should almost never be operated upon, as a gastro-enterostomy in such cases not only is of no value, but in certain instances the symptoms are aggravated. On the other hand, a neurasthenic who suffers from some pathological lesion should be granted surgical relief (if necessary) from the effect of that lesion, but should not be given any assurance of relief to his or her neurasthenia.

Furthermore, in justification to all of us, physicians as well as surgeons, a certain small proportion of such cases—so-called border-line cases—are most obscure and misleading, and the patient should be frankly told that, while he probably has some visceral lesion, a positive diagnosis is impossible without an exploratory operation.

That I may swing too far to the surgical side is only natural, but no one is better aware of it than I am. I fully realize that the family doctor sees many cases of dyspepsia that very readily yield to some medication, a change from an improper to a proper diet, a rest from overwork and worry, etc. These cases naturally never consult the surgeon; they do not require his services.

Nevertheless, I became convinced years ago from reading over and studying the histories of hundreds of abdominal cases in which the symptoms were pre-eminently dyspepsia and indigestion, and today I believe more firmly than ever that every case of recurrent or obstinate indigestion that does not yield to the intelligent treatment of the internist should have an opinion from one who views things through surgical glasses if for no other reason than to eliminate the advisability of operation.

DISCUSSION.

Dr. John W. Price, Louisville, Ky.—This subject is of interest to us all, I am sure. It has been our experience that most of these cases that come to the surgeon—chronic digestive disturbances—are due to lesions about the appendix, the cecum, the gall bladder or gall ducts, or possibly to some pelvic lesion, with adhesions. Some have true lesions of pylorus and duodenum.

For the diagnosis of these conditions we rely almost entirely upon our histories and our physical examination. I believe that a carefully taken history in these cases will, in 95 per cent of the cases, direct the surgeon to a correct diagnosis. We should not neglect the use of all modern laboratory methods to assist us. We make stomach

analysis, blood analysis and examinations of the stool and the urine. We further, in all cases where there is some symptom of an obstruction, give the bismuth meal and have skiagraphs made at different hours after the meal and on different days, but it has been our experience that the X-ray, while of great assistance, is not as successful in making the diagnosis as the history. That is my own view about this matter.

I recall a case very similar to the first case the doctor reported: A young man gave a definite history of appendicitis, with localized abscess, which occurred fifteen years previously, which was not operated upon, which gradually underwent absorption under the care of the physician who had diagnosed his case as malaria, because he had fever and chills and sweats which continued for weeks. He said he was in bed for some six or seven weeks, with a lump in his side, but that was of no importance to his doctor. This young man recovered from his illness, and from that time his symptoms of indigestion were persistent. The symptoms referable to the pylorus and duodenum in this case were so striking that the bismuth meal was given. The radiographer reported that the skiagraph, eight hours after the test meal, showed the greater portion of the bismuth meal was in the stomach, the pylorus in active spasm, and, in his opinion, the man had an undoubted duodenal ulcer. I had gone over the history of the case previously, and was firmly convinced that he had no ulcer. As to the operation, the duodenum and pylorus were found to be normal. The appendix at the lower third had been ulcerated and perforated, and adhesions were there extending up on the cecum. After the appendix was removed the adhesions were separated and raw surfaces covered. The man made a complete recovery. Two months afterwards he reported no digestive disturbances. He was on regular diet, and had gained some twenty pounds. It seems clear in this case that the digestive disturbances followed the pylorospasm, which was due to appendiceal adhesions.

Dr. J. A. Crisler—The paper shows so much thought, and is so accurate both in conclusions and in fact in its English, and in the presentation of a clear conception, that I think it is one of the most beautiful and worthy papers that I have ever heard read.

The doctor brought out a point that is worth emphasizing in those cases, referable to bad adhesions about the liver and the duodenum, in which he mentioned melancholia. The melancholia in these cases is something worth considering.

I call to mind a case of interest from a diagnostic standpoint, wherein three of our most finished men diagnosed a cancer of the stomach. I was called in merely to satisfy the son of the patient, who was a doctor, and recommended an exploratory incision. We found no stomach trouble whatever, but a large number of gallstones and adhesions. The patient gained some fifty pounds in six months, and is now a well, healthy person.

Dr. E. S. Sledge, Mobile, Ala.—As an internist, I thank the doctor for the presentation he has given us. Our branch of the profession is being more and more forced every day to respect the surgeon for his aggressiveness if for nothing else. We must admit that they are getting results sometimes where we have failed with pure medical measures. I have myself, in the last three or four years, seen so very many of these cases of indigestion, due to all sorts of surgicial lesions, not only of the gastro-intestinal tract and its appendages, but of the kidneys, and even the whole genito-urinary tract, that sometimes I feel that I will have to turn surgeon, too, for they get so many of my abdominal cases.

I just wish to again thank the doctor for the paper, because he has struck so many of these cases that I have found typical myself. In my work the X-ray has proven the key to the situation in most instances.

Dr. J. H. Blackburn, Bowling Green, Ky.—I just wish to thank the doctor for this paper, the data, and particularly that he has dealt so completely with the differential diagnosis. We are all, no doubt, familiar with the two extremes, the surgeon who is willing to operate on every case of indigestion, and the man at the other extreme, who does not believe that indigestion ought ever to be operated upon, and I believe the doctor has given us a paper that is certainly worth while. To study our cases, as Dr. Thorning has studied his cases, will help us to clear up, in our minds, that not every case may be treated with a tablet that some of our commercial friends tell us is a sure cure for indigestion. In turn, not all of our cases need surgical intervention. We ought to differentiate clearly and fully in these cases.

Dr. Chas. V. Stephenson, Centreville, Tenn.—I am certainly very glad to hear this paper and to know that surgeons are able to relieve our indigestive patients after the physician has failed to give relief.

I fear we often fail to impress the people with the necessity of an early operation. I think we should never fail to impress, or try to impress, them with this necessity, and I think we should not go too far with our medicines before consulting a surgeon and giving him a fair chance to do something for them.

I believe that indigestion is a condition which merits more attention from the patients, who so often are satisfied with self-treatment and with advertised quack remedies and such as they are able to procure at the druggists's. And I believe it to be a condition which deserves more attention than is ordinarily given by the average general practitioner; and that he should be sufficiently well-posted to arrive early at a correct conclusion as to the cause of the trouble, and to know whether it is a condition that will require medicines or an operation to relieve it, thus avoiding malignancy, which, to my mind, develops because of neglect as well as from illy-treated cases of indigestion.

Dr. Thorning closes—I have very little to add to what I have said except that I wish to say I am not unmindful or unappreciative of the honor of appearing before this body of distinguished gentlemen. This is my first appearance at the Southern Medical Association. I sincerely hope that it will not be my last.

As my time does not extend throughout the whole day, I cannot take up all of the ideas that I have gathered from this discussion, but one thing I would like to mention: Dr. Sledge brought

out this question of the internist. There has never been a time when the internist and surgeon have had greater need, or more incentive to work together than now, and perhaps no class of cases call for closer co-operation than those under discussion. Another point: Dr. Stephenson emphasized the importance of early diagnosis. I believe it is our duty to educate the public along this line, and teach them that early and correct diagnosis contributes as much to the successful outcome of a surgical case as does the operation itself, and that for this prompt work the internist is entitled to proper compensation. My suggestion would be that the general practitioner, instead of trying to be known as a surgeon, strive rather to be known as a diagnostician and charge accordingly, turning his surgical cases to surgeons. I believe this would result in more general satisfaction to the patient, and perhaps be just as well for the physician.

GROWTHS AND SYNDROMES OF THE THYROID GLAND REQUIRING OPERATION.*

By William D. Haggard, M.D., F. A. C. S.
Professor of Surgery and Clinical Surgery, Vanderbilt University; Surgeon to St. Thomas, Vanderbilt and City Hospitals.
Nashville, Tenn.

The simplest growth of the thyroid gland is the encapsulated adenoma. It is the smooth round tumor usually in the front of the neck pressing forward under the muscles. It has a rather tense feel and is usually single. It can be hulled out of the gland without the necessity of the removal of all of the lobe or any part thereof. The symmmetrical, or nodular goiters are adenomata of the fetal or adult type. The colloid variety assumes huge proportions. There also exists a hypertrophic colloid and parenchymatous goiter, in addition to the hypertrophic parenchymatous adenoma, both of which, as a rule, show great increase of cellular elements with involutions of the lining cells of the acini. These two last varieties show the well-known symptoms of hyperthyroidism, or exophthalmic goiter. Any of these types may undergo degenerative changes, such as granular, fatty, necrotic, cystic, fibrous, hemorrhagic, calcareous and hyaline.

MacCarty has thus very greatly simplified the classification by describing half a dozen histological units of which the above are comprised and one or more are uniformly found in every thyroid, whether symmetrically enlarged or not.

Aside from the adenomas there are practically no new growths in the thyroid gland save fibroma and lipoma, which are exceedingly rare. Of the malignant growths carcinoma is very much more frequent than sarcoma and is to be suspected when a long-standing goiter undergoes sudden, rapid enlargement. Unfortunately, it makes great headway before it is removed.

Fig. 1—Encapsulated adenoma. Twenty years' duration. Mother and two sisters had goiter.

Benign enlargements of the thyroid gland give rise to various pressure symptoms, which are particularly expended on the trachea, blood vessels and nerves. They may grow to enor-

*Read in Section on Surgery of the Southern Medical Association, seventh annual meeting, Lexington, Ky., Nov. 17-20, 1913.

mous proportions, but their symptoms depend upon their location and whether or not interference with the respiratory and digestive tubes occur. About one case in five has paresis of one or both vocal cords. The trachea may be greatly distorted and pressed upon, giving rise to shortness of breath and even stridor when any exertion is required. Sudden and severe attacks of dyspnœa may occur from the slightest cause and occasionally cause death where the constriction of the trachea is extreme. During the last two decades many symptom-producing goitrous enlargements have been removed and it is rare that one sees the great deformities of the pre-operative period in this country.

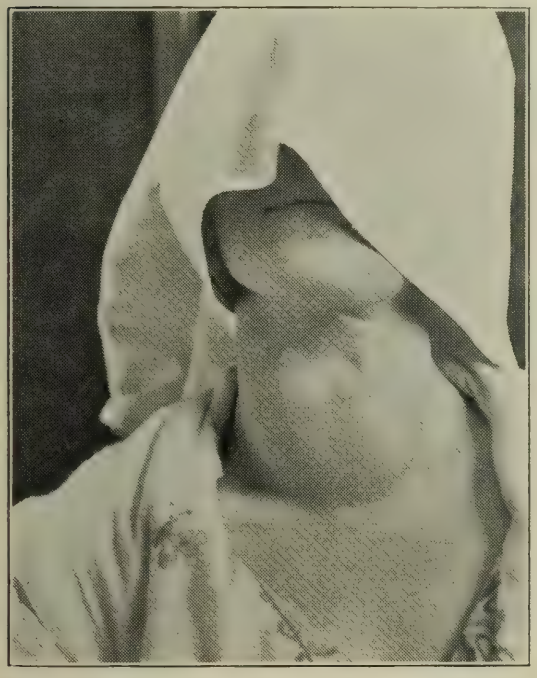

Fig. 2—Hypertrophic colloid goiter with cystic degeneration.

Fig. 3—Colloid adenoma. Right thyroidectomy; three colloid masses enucleated from left lobe.

Whenever such enlargements progressively increase in size producing difficulty in swallowing, interference with respiration from pressure upon the trachea, dyspnœa on exertion, on stooping, difficult breathing, alteration of the voice, or from mere size and disfigurement become a source of mortification and embarrassment, operation is indicated. Pressure on the trachea and blood vessels often produce cardiac insufficiency, especially when the goiter is substernal. The so-called goiter heart occurs in about 20 per cent of simple goiters. Moreover, a certain number of apparently plain goiters undergo hyperplastic cellular change, with development of typical Graves' disease. In one of my early cases death resulted in a young woman within two weeks following an acute tonsillitis which stimulated an unobtrusive goiter of five years' duration to pathologic activity with extreme tachycardia, vomiting, diarrhoea, restlessness and delirium. On the other hand, I have seen a fatal thyroid intoxication as a result of engrafting of thyrotoxicosis on a goiter of thirty-five years' duration. It is estimated that one-fifth of the adenomata develop hyperthyroidism.

The malignant degenerations are usually from old colloid goiters.

The cause of spontaneous exophthalmic goiter, or its secondary appearance in connection with a pre-existing thyroid gland, is wrapped in mystery. A great deal of experimentation has failed to unravel the tangled thread of etiology. By many it is contended that the cause resides in the thyroid gland alone. Kloze injected one c.c. of thyroid fluid of the gland from a patient operated on for exophthalmic goiter into an animal and as a result observed a temperature of 107, with irregularity in the pulse, fall in blood pressure with lymphocytosis, emaciation, shedding of hair and exophthalmos. Baruch produced symptoms closely resembling the above by injecting the ground goiter material into the lower animals. Grube injected certain toxic extracts of exophthalmic goiters and found that the degree of the effect on the blood pressure can be brought into relationship clinically with attacks of intoxication. As a matter of fact, we will never know the whole story of the thyroid functions, its changes and diseases until some animal with a patent thyroid duct is discovered. One cannot but be impressed with the kinetic theory of Crile and its relationship to the motor mechanisms of woman as influenced by the vicissitudes and environments of modern life. He regards Graves' disease as a disease of the emotions. The stimuli coming from countless forms of fright, worry, anxiety, grief, etc. This, acting upon the nervous system, in turn activates the ductless glands, of which the thyroid becomes the most affected, and which in turn becomes an activator. It is stimulated, as has been said, by infectious diseases, by thyroid extract, iodine and various nerve excitations.

Fig. 4—Asymmetrical adenoma. Right lobe and isthmus thyroid gland; ten years' duration. Scar right arm five days after removal encapsulated round-celled sarcoma. Four years since appearance.

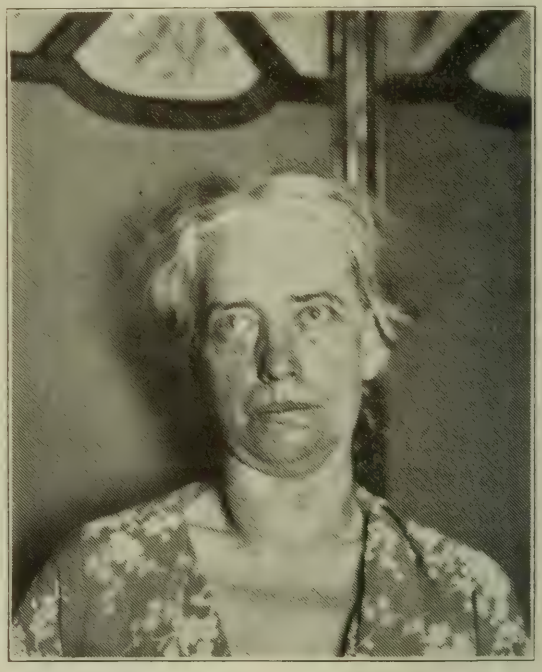

Fig. 5—Hypertrophic parenchymatous (exophthalmic) goiter. Extreme hyperthyroidism. Ligation both superior thyroid arteries, followed in three months by enucleation right and middle lobes, with less severe reaction than from the preliminary ligations.

The greater frequency of this disease in the female is associated with her emotions and sex life. The average age of the appearance of the symptoms comprising the full-blown syndrome is 32. The disease reaches its maximum, ac-

cording to Plummer, during the latter part of the first six months. If improvement occurs it is at its best at the end of the first year, the period of exacerbation occuring from the ensuing second to fourth year. The secondary symptoms then remain with more or less permanence. No matter what is the cause, there is marked evidence of some toxin expending itself upon the vital organs and particularly upon the nervous system and circulatory apparatus. The mental irritability, tachycardia, vaso-motor disturbances in the skin, with tremor, muscular weakness, especially of the knees, loss of weight, diarrhœa and vomiting and the exophthalmos are so characteristic that they comprise a syndrome that is not simulated by any known disease. If permitted to go on for over a year there is a secondary toxic effect upon the great organs, heart and kidneys, presenting their syndrome as additions to the clinical complex.

The lagging of the eyelids, the widening of the palpebral slits, the prominent, shiny, staring, fishy, eye that seldom winks is pathognomic.

The pathology is no less uncertain. Thus Wilson out of 1,793 thyroids found only four cases that contained large areas of primary hypertrophy that did not show clinical symptoms of exophthalmic goiter. He concludes that these characteristic changes in the gland bear the same direct and constant relationship to true exophthalmic goiter as does primary inflammation of the kidneys to Bright's disease. At the present time some form of operative treatment gives the best result in the management of this protean disease. Kocher says the best way to improve the statistics is by operating earlier and earlier, and medical treatment finds its best place during convalescence. A very considerable number of early cases of hyperthyroidism can be very promptly cured by simple ligation of one or both upper poles. By including the superior thyroid artery, veins and nerves a reversion to simple type and restitution of gland elements is brought about. Instead of carrying the patients through a number of years of transient improvement by the temporary remedies employed, is it not wiser to institute radical cure with a low mortality of from 1 to 4 per cent than to take the risk of the ultimate mortality of from 12 to 15 per cent, according to Von Eiselberg, and the very great probability of permanent visceral changes for which there is no remedy? Mayo, who has had the largest experience in the world, has had a consecutive series of 276 cases between deaths. As Crile says: "In the late stage of the disease, in which there is a physical wreckage of most of the organs of the body, including the thyroid itself, from the body-wide stimulation, there may be an odd mixture of myxedema and Graves' disease; the body is like the charred remains of a partially burned building, whatever is done toward salvage, the fire extinguisher is no longer needed; the fire (Graves' disease) has burned itself out." Eppinger, considering the brillant operative cures, champions the surgical treatment, condemns the X-ray treatment, and advises dietetic and hygienic management in certain cases, but if there is no improvement in from one to three months operation is indicated.

Fig. 6—Mrs. B. aet. 40. Extreme case exophthalmic goiter (hyperthyroidism) 10 weeks; confinement to bed, vomiting, diarrhoea, loss of 59 lbs. Pulse 160-180, showing prominent, shining, staring eye (Stellwags' sign). No. goiter. Cured by ligation —both superior thyroid arteries.

One of my most striking cases was in a

woman, 36 years old, acutely ill for ten weeks, with severe vomiting and diarrhea, with a loss of fifty-nine pounds. Pulse varying from 160 to 180, so extremely nervous and weak transportation all but resulted in death. A ligation of first one and then the other superior thyroid artery very promptly resulted in great improvement, with a gain of seventy pounds in ninety days. In this case there was scarcely any perceptible enlargement of the thyroid and hence I have not advised the removal of either lobe. She has since borne a child and is well.

The acute exacerbation should be the *noli*

Fig. 7—Same as Fig. 6, five months after.

me tangere of the surgeon. If undertaken when the disease is at its height, fatal intoxication will often ensue within thirty-six hours. The same may be said of the very far advanced cases with cardiac insufficiency, ascites, etc. Careful medical management may restore some of these cases to a condition where surgery can benefit.

As Crile has said: "In any case the operation is but a means to the end. The raising of the threshold of environmental stimuli by diminishing the amount of activating sensitizing thyroid secretion and in conjunction with physical and psychic rest, permitting the patient to regain the power of normal control by the brain. Travel, diversion, nature, all are helpful, the operation serving to break the pathological chain at one of its strongest links. These patients should be and can be literally taken by the hand and led away from mankind through the flowery paths of ease and pleasure to the haven of health."

REPORT OF A CASE OF PRIAPISM RELIEVED BY INTRAVENOUS INJECTIONS OF SALVARSAN.*

By Courtney W. Shropshire, M.D.,
Genito-Urinary Surgeon to Hillman Hospital, Birmingham, Ala.,
and
Charles J. Watterston, M.D.,
Birmingham, Ala.

At the present time, when the use of salvarsan is so prominently before the eyes of the research worker, specialist and general practitioner, we feel that it is the duty of those using the new preparation to report series of parallel or isolated cases, if rare, so that all may better judge its value in syphilitic and para syphilitic conditions.

The case which we report is of the isolated type; however, it is, in our estimation, of sufficient interest to present to this meeting, but more for discussion, for we confess uncertainty as to the exact manner in which the symptoms were produced.

The following is the case history, with treatment:

Robert Jackson, color black, male, weight one

*Read by title in Section on Surgery of the Southern Medical Association, seventh annual meeting, Lexington, Ky., November 17-20, 1913.

hundred and fifty pounds, height six feet, age thirty-six.

Family History.—Unobtainable.

Past History.—Patient claims that he has not been sufficiently ill to require the services of a physician since the age of twelve.

Venereal History.—Six years ago he had an attack of gonorrhoea, which ran an acute course, treatment being stopped just as soon as the discharge was checked.

Five years ago he had a chancre on which he used a powder, which was furnished by a physician, at the same time taking internal medication in the form of pills.

Duration of chancre was one month, and medication was continued intermittently over a period of six months.

A second attack of gonorrhoea was contracted one year later. The course was prolonged and treatment was by injection and internal medication. The duration of the attack was three months.

The last attack of gonorrhoea was two years ago. At that time he had considerable trouble in retaining his urine, and at the end of the act of urinating there were frequently passed a few drops of blood.

Present History.—About eighteen months ago the patient first noticed that he had trouble in retaining his urine, the bladder having to be emptied many times during the day, and three or four times during the night. He tried many remedies, as his friends advised, but without avail, his condition becoming worse all the time until, instead of urinating at frequent intervals, there was a constant dribbling of urine with occasional painful contractions of the muscles of his bladder.

Two weeks before his admission to the Hillman Hospital, during one of these attacks of painful contraction of his bladder, there was an incomplete erection of his penis, which lasted several hours and caused great pain. On the following day the penis again became erect, and has remained so until May 15th, 1913, when he was admitted to the Genito-Urinary Department of the Hillman Hospital.

Examination, on June 1st, fifteen days later, revealed the following:

There was nothing in the patient's appearance to denote disease, except emaciation. The skin was normal, eyes and mucous membranes negative, teeth bad, tongue coated and thickened.

Chest.—Inspection normal shape. Palpation negative. Percussion high pitches in infraclavicular spaces. Ausculation coarse rales in the infraclavicular spaces; fine moist rales at the base posteriorly.

Heart.—Inspection, apex in fifth interspace on the nipple line. Palpation, negative. Percussion, no enlargement could be made out. Auscultation, aortic insufficiency.

Abdomen.—Slight enlargement of the spleen.

Genitals.—Penis erect. Dorsal surface of penis presented an incised wound about two inches in length, "which was made by the surgeons previously on services." Penis was very painful to touch.

Prostate Gland.—Enlarged on right side, nodules could be made out at the junction of the prostate gland and seminal vesicles. Urine dribbles from penis.

Lower Extremeties.—Negative. Temperature 103, pulse 120, respiration 24. Chemical examination of the urine showed albumen. Microscopical examination of the urine showed a granular cast.

The Wassermann blood examination, which was made by Dr. Chas. J. Watterston, was negative. Patient refused to have his spinal fluid taken.

A luetin skin test was applied, the luetin being kindly furnished by Dr. Noguchi, of the Rockefeller Institute for Medical Research, of New York City, New York.

On June 4th patient's condition about the same.

Luetin skin test positive, the reaction being of the papular variety.

Dr. C. M. Rudolph, neurologist to the Hillman Hospital, of this city, was called into consultation, and he said that in his opinion the priapism was due to a central lesion.

Diagnosis.—Syphilis of the central nervous system, with involvement of the lumbar cord, or its meninges. Aortic insufficiency with nephritis.

Treatment.—On June 4th, 0.3 gm. of salvarsan was given intravenously, the temperature rising from 101 to 103, and his bowels moving six or eight times.

Examination on June 5th presented the following:

Penis not as congested as on the previous day; wound in penis very red, with white slough appearing in center. We removed part of the slough and patient said that he felt much better. His urine continues to dribble. Temperature 99.8, pulse 78.

Chemical examination of his urine showed albumen. Microscopical examination of his urine showed a few granular cast.

Examination on June 6th:

Remains of slough removed, leaving a granulating surface. Penis swollen but not erect. Uri-

nating at intervals; still some dribbling. Temperature 104, pulse 102.

Chemical examination of his urine failed to show any albumin. Microscopical examination of his urine failed to show any cast.

On June 11th, 0.3 gm. of salvarsan was given intravenously, slight reaction. The wound in penis was completely healed. Patient urinates at intervals, there is no dribbling. Patient said he felt well.

The chemical and microscopical examination of his urine failed to show any albumen or cast. Temperature 101, pulse 80, leucocytes 12,000 plasmodia negative.

In spite of the negative plasmodia we decided to put the patient on quinine because of the intermittent temperature.

Ten grains of bisulphate of quinine were given each hour, beginning at 6 o'clock in the morning, until thirty grains were taken.

June 12th, temperature 98.6, pulse 64. The chemical and microscopical examination of his urine was negative as to albumen and cast.

The temperature and pulse continued normal, and the patient was allowed out of bed on June 14th.

On June 18th, patient was given 0.3 gm. of salvarsan intravenously, there being no reaction from this.

Urethroscopic and cystoscopic examinations on the following day revealed nothing of interest.

Patient was discharged and told to return on June 25th to out-patient department, which he failed to.

Addendum.—Since writing this paper Robert Jackson called at our office.

Examination at this time, November 18th, 1913, shows him to be in first-class condition, weight one hundred and ninety pounds, slight scar on penis. Function has been entirely restored.

327-30 First National Bank Bldg.

SURGICAL TREATMENT OF ANURIA.

By Geo. R. Livermore, M.D.,
Professor Genito-Urinary Diseases, University of Tennessee; Genito-Urinary Surgeon, Baptist and City Hospitals; Associate Surgeon Lucy Brinkley Hospital, Memphis, Tenn.

The kidneys are exposed, delivered and stripped of their capsules, according to the method of Edhebohl, a ½-inch incision is then made in the cortex of each kidney, in the center of its convex border and continued into the pelvis. A strip of gauze ½-inch wide is saturated with a 10 per cent ichthyol in glycerine solution, grasped with dressing forceps and carried through the incision in the cortex into the pelvis of the kidney. The gauze may be packed directly into the pelvis of the kidney instead of going through the cortex, but I believe it better to have the action of the ichthyol and glycerine on both cortex and pelvis.

The kidneys are then returned to their positions and the wounds closed with the drains coming out in the center of the wounds. The gauze should be renewed in twenty-four hours and the wounds again packed with fresh gauze saturated with the ichthyol glycerine solution.

Repeat procedure till free diuresis is established.

February 2, 1914.

This report is premature and would not have been made had I not demonstrated my method February 1, 1914, at 1 a.m., to Dr. L. L. Meyer, the internes and nurses at the City Hospital, on a case of anuria following bichloride of mercury poisoning. He was operated on one week after taking the bichloride and was in a hopeless condition and died on the table before the operation was completed, and the result, as far as establishing diuresis was concerned, could not be ascertained.

I believe it to be a rational procedure, and hence announce it to the profession in the hope that it may be tried by other surgeons and its results made known.

Exchange Building.

ANORECTAL IMPERFORATION. CASE REPORT WITH AUTOPSY FINDINGS. TENTATIVE OPERATION.*

By Herbert P. Cole, M.D.,
Associate Professor of Gynecology, Medical Department, University of Alabama, Mobile, Ala.

The development of the anus and rectum

*Read before the Chicago Medical Society, June 17, 1913.

from different layers of the blastoderum together with an independent blood supply leads not uncommonly to malformation of these structures. Congenital absence of both these organs in the same individual without appearance of other congenital deformities is an exceedingly rare condition.

The following case report with autopsy findings substantiates the reconstruction work of the embryologists and offers a pertinent suggestion as to the futility of our modern methods of operative treatment. The sigmoid and rectum develop from the mesoblastic tissue and the anus from the epiblastic. After the sixth week the colon and the rectum growing more rapidly than the small intestine extend downward toward the epiblast. At the same time the epiblast invaginates upwards, the layers of the mesoblast coalesce or absorb and the epiblastic portion of the anal membrane perforates at about the thirtieth day, establishing a continuation of the rectum with the anal canal. The persistence of the anal membrane (cloacal plate) until birth has been assumed to account for cases of atresia ani.

The hind gut ends at the third week in a dilated chamber into which open the Wolffian ducts; this chamber is called the cloaca entodermica. This chamber is later divided by a septum into a dorsal and ventral passage, becoming the rectum and unrogenital sinus respectively. The anterior aspect of the cloaca entodermica is closed by a membrane consisting of ectoderm, later giving rise to the appearance of an anus, as the posterior portion of the membrane; the cloacal plate absorbs. When this cloacal plate fails to absorb there is a congenital absence of the anus. Likewise failure of the development and downward extension of the septum between the cloaca and unrogenital sinus obviates the formation of a rectum. The rectum will be fused more or less with the bladder according to the extent to which this septum is developed. The specimen obtained from the case to be reported substantiates this theory, disclosing the blind hind gut fused to the base of the bladder with an entire absence of the rectum.

Mall, in his reconstruction of a human embryo of 17 m. m. (Figure 204, Quain's Embryology, T. H. Brice), demonstrates the ureter and Wolffian duct passing around the hind gut just above the developing cloaca entodermica. This specimen beautifully illustrates the accuracy of his reconstruction by demonstrat-

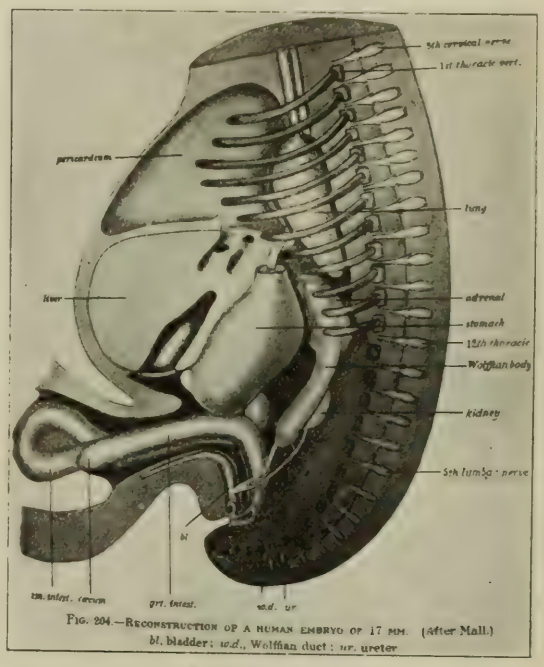

FIG. 204.—RECONSTRUCTION OF A HUMAN EMBRYO OF 17 MM. (After Mall.)
bl. bladder; w.d., Wolffian duct; ur. ureter

Reconstruction figure demonstrating ureter and Wolffian duct passing about the embryonic great intestine and fusing with the bladder.

ing bilateral hydro-ureter formation in the enveloping ureters at the base of the bladder.

Surgical procedures for the relief of these conditions have been carried on since the seventeenth century when Paulus Aegineta successfully operated upon a case of atresia in an infant by incising and dilating the perineum. This primitive procedure was continued until the nineteenth century, when Roux de Brignolles, in 1835, reported a number of successful cases in which he advocated preservation of the anal spincter. Berard, in 1834; Vidal de Cassis, Guillon, Malgaigne and Velpeau, in the same country, together with

Dieffenbach, who also advised resorting to colotomy if the perineal incision failed to open the rectal cul de sac, were other surgeons whose names are worthy of mention in association with procedures for the correction of this deformity. About the same period (1800) Dr. John P. Campbell, of Flemingsburg, Ky., was the first surgeon in our country to successfully operate for this condition. Amussat employed the first perineal operation in 1835, advocating a careful dissection of the perineum and exposure of the rectal ampulla, freely detaching the rectum from the surrounding tissues and suturing its mucosa to the skin margins without undue tension, after first evacuating the contents of the ampulla. This union of the mucous membrane with the skin obviated the constrictions following the previous methods. In the cases where the terminal end of the rectum can be easily reached through the perineum this method with few modifications is the one generally employed today.

Photograph, reduced one-half. Specimen removed from this case. Note the bladder opened and reflected upon the blind hind gut to which the bladder is fused at the trigonum. Note the lower ends of the ureters constricted by the dilated blind hind gut, marked hydroureter formation especially in left.

In 1844, Stromeyer advocated the additional step of exploring the pelvic conditions through the abdomen. This was first performed, however, in 1872 by Lieserink apparently with a splendid result. This has since been performed by other operators. The history of this field of surgery is thoroughly reported by Earle in his work on the Diseases of the Rectum and Sigmoid. We have drawn largely on his account in this report.

The necessity of immediate radical surgical interference where there is a complete occlusion must in young infants be followed by a necessarily high mortality rate. The variety of malformations that may be present, together with the difficulty of ascertaining the extent of the congenital defect obviate our outlining any routine operation that would be applicable in all cases.

Hardouin (Archives Generales de Chirugie, Paris, November 25, ii, No. 11, pp. 445-551), in summarizing 223 cases of anorectal imperforation discloses the unfortunate fact that 55.2 per cent of the patients die within the first week and 44.4 per cent during the first month; the operation proved successful in 11.55 per cent of the cases in which the results could be followed for over one year and in 5.8 per cent in the cases followed over 20 years. Hardouin divides his summary into six groups of cases according to the six types of operation employed. Apparently the results from the Littre method (the artificial anus in the left iliac region) far exceed the results of other methods. At best, however, the functional results of operative treatment have been disappointing, as only 16 of the 223 patients lived to puberty and 13 to adult life. Stricture is the most formidable complication, incontinence is frequent and prolapse occasional.

CASE REPORT WITH AUTOPSY FINDINGS.

April 14, 1913. City Hospital, Mobile, Ala. Referred by Dr. Kimball, of Jackson, Ala.

Patient, male negro infant, age four days, normal family history, normal birth.

Present Illness—The patient appears normal, nursing with regurgitation. The urine has been very scanty in amount and darkly discolored. There have been no bowel movements. The absence of the anus was discovered by the mother twenty-four hours after birth. The patient was sent to Mobile on the third day for operative interference. Death on the fourth day in mild convulsions before the operation was undertaken.

Autopsy Findings—Autopsy twenty hours after death. Nefro infant, age four days. Abdomen is somewhat distended. There is a dark green watery stain upon the napkin.

Male negro infant; age four days. Note entire absence of anus. Replaced by a rugous oval-shaped extension of the scrotal raphe.

There is an entire absence of the anus. Its situation is occupied by a darkly pigmentated elevated and rugous oval-shaped extension of the scrotal raphe. No depression. Pelvic measurements normal, except the intestines, are found to be slightly distended with gas.

There is considerable free bloody fluid in the peritoneal cavity. The stomach and small intestine present no abnormalities. The cecum occupies the normal position for a child of this age. There is a thin pericolic membrane to the inner side of the cecum and above the ileum pulling the ascending colon over toward the mesentric attachment. The appendix, 3 c.m. long, dips towards the pelvis. The ascending and transverse colon are distended. The lower end of the sigmoid colon ends in a blind pouch fused to the base of the bladder posteriorly.

Upon opening the bladder there is a slight depression at the base of the trigone; this is darkly stained. There is no evident communication with the hind gut. The blind pouch is surrounded on either side by a ureter which is constricted into a small band at the area of contact. At the sacral crest the left ureter is dilated to a tube one cm. in diameter. This dilatation persists to the kidney pelvis. The right tube is dilated to a tube one-half cm. in diameter at the pelvic crest. This dilatation persists to the renal pelvis. Both kidneys are apparently normal.

Autopsy Summary—Anorectal imperforation, bilateral hydro-ureter due to ureteral obstruction from pressure of the distended hind gut fused into the base of the bladded. Death from anuria.

CONCLUSIONS.

The multiplicity of procedures employed in the treatment of anorectal imperforation, together with the prohibitive mortality rate is conclusive evidence that the present day methods are not established on sound surgical principles.

All perineal operations for the correction of this condition will assuredly be attended by a grave mortality rate through failure of correction of essential obstructions that will only be evident through an abdominal exposure.

By the abdominal route, a careful survey of the pelvic conditions must be made, and where it is possible the blind gut may be mobilized after the suggestion of Macleod, and be pushed down to the perineum and there fixed to the skin by the perineal route. A careful examination of the ureters and bladder may ascertain the presence of ureteral obstruction or vesical communication. In this event mobilization, together with the establishment of an artificial anus in the inguinal or lumbar region, is advisable. A perineal operation may be attempted later in life.

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FOREIGN BODY IN THE SPHENOID CAVITY.*

By R. B. Nelson, M.D.,
Memphis, Tenn.

In view of the inaccessibility of the sphenoid cavity it is not surprising that medical literature contains so little relative to its injury by penetration or lodgement of a foreign body. The regurgitation of food in the naso pharynx caused by vomiting offering possibly the only means whereby the cavity could be entered by a foreign substance, the likelihood of this occurring, due to its small opening high up in the naso pharynx, is very remote.

I once read a very interesting report of a case where, during an operation upon the sphenoid sinus of breaking down the anterior wall, the end of the instrument broke and was lost. The accident occurred at the termination of the operation, and the fact of the instrument being broken was not noticed. Very soon afterwards, however, severe symptoms arose and a second and third operation were done before the foreign body was removed and the patient relieved.

I mention the above case for the reason that it is the only instance of which I have read of a foreign body penetrating or lodging in the sphenoid cavity, and it differs from the one I have to report, especially in one detail, namely, the severity of the train of symptoms enumerated in the recital of the case above, and the slight reaction occasioned by the one of which I wish to report.

On the 15th of June Mr. C., aged 26, presented himself for examination and treatment, and gave a history of having six weeks previous been involved in an argument with two other men, both of whom attacked him, and a fist fight resulted. They were soon separated, and he returned to his place of business suffering no pain and unaware of any injury. Shortly afterwards, however, while passing his hand over his face he felt a tumefaction on the left side of his nose, and some pain on pressure. Thinking it only a slight bruise he paid no attention to his condition for several days. Finally, however, when the swelling failed to go down, and he began to feel a little uneasiness on the affected side of his face, he consulted his family physician. A line of treatment was advocated, and he was told to report in a few days. At the end of a week he presented himself to the same physician complaining of frequent slight headaches and a discharge from his nose and throat. A spray was prescribed and for several weeks used by the patient. Getting no relief at the end of six weeks dating from the time of injury, he was referred to me.

On external examination I found the left side of his nose swollen, but not to a degree that was particularly disfiguring, yet at one point very red and inflamed. Only slight manipulation was tolerated, and this occasioned a great deal of pain, the nose feeling hard and unyielding. A mental diagnosis of fracture of the lower and of the nasal bone was made, and I proceeded to substantiate my diagnosis by internal inspection. The anterior tip of the middle turbinate was completely hidden by granulations and a small amount of pus could be seen. After shrinking the parts to their utmost and, as I thought, thoroughly anesthetizing them with cocain and adrenalin, I attempted to find the spicule of bone I felt sure was causing the trouble, but on each attempt at better examination by use of the probe the patient complained of pain. Thinking he was unusually frightened, or possibly the cocain was inert, I applied a ten per cent fresh solution, but on each effort at examination the patient continued to resist, stating the pain unbearable. This was naturally puzzling. However, I curetted the granulations, sprayed the nose and told him to report the next day. My next effort meeting with the same failure, I ordered him to the hospital and under a

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general anesthetic I curetted some more granulations, and after removing the tip of the middle turbinate bone, I came upon the end of this pencil, which was removed, leaving a clear opening through the body of the middle turbinate bone into the sphenoid sinus.

To me the most striking feature of the case is the fact that the foreign body remained in the nose and sinus six weeks without causing any more symptoms than it did. The only pain felt was when he would blow his nose and thereby caused pressure on that side.

The pain occasioned during the examination was naturally the result of the movements of the far end of the pencil against tissue that had not been anesthetized.

Measurements on the human skull of medium size show that the pencil, which is two and a half inches long, not only penetrated the sphenoid sinus, but passed completely through to the posterior wall.

DISCUSSION.

Dudley S. Reynolds, Louisville, Kentucky.—While the doctor was reading his paper a case recurred to me which I had a number of years ago, in the person of Judge Russell Huston, who, in a carriage, had a runaway accident, in which one of the front wheels struck a telegraph pole. It was crushed, the carriage was wrecked. The spokes of the wheels, which were made of hickory, splintered, and the splintered end struck the judge fair in the face, on the side of the nose and cheek and crushed his upper lip. A surgeon of Louisville saw him, and, as he supposed, removed all the foreign matter from his face and nose. But the judge continued to have pain. The external parts cured over. The slightest touch about the malar bone resulted in excruciating pain. The pain from sneezing was also severe. He had business in New York, and called on Dr. Sand. He made an incision and removed two or three splinters of hickory; and, thinking his patient would get well, he closed up the wound and prepared him to return home. The judge returned to Louisville but continued to suffer. He consulted me and gave me the history. The parts I couldn't see I attempted to explore with the probe; the middle passage of the nose. In passing the probe I encountered something that felt like exposed bone. I took a blunt hook and tried to pass behind it. I am a fisherman and keep piano wire. I cut off a portion of the wire and dressed it on a whetstone so as to smooth the end, which I bent into the form of a hook. I slipped it in and turned it around in various directions. I could move the body. Then I decided to make a bolder attempt, and with a pair of forceps I passed in, and caught hold of the foreign body and pulled out a piece of it. It was wood, wood fiber. I cheered the patient, encouraging him all I could. I went fishing again with my blunt hook. After a while I got the end of the hook apparently entangled with the upper portion of the foreign body, but could not pull it out, so I sawed out the inferior turbinate bone. Immediately after this I easily got out three more splinters. These had been driven back into the sphenoidal cells, and remained there about a year and a half after the accident before he came to me. He promptly recovered, with increased comfort and freedom in nasal respiration.

That instructed me to search diligently until I find the source of any purulent discharge from the nose. It does not do any harm to take out a turbinate bone, even the inferior turbinate. The middle turbinate is more easily removed. That was the first instance I had occasion to remove the inferior turbinate bone.

J. Ivimey Dowling, Albany, N. Y.—I have never personally observed a foreign body in the sphenoid sinus, but I witnessed one in Chicago last summer at the office of another surgeon. While examining a young lady he said: "There it is." I asked what he meant. He replied, "I lost the end of my forceps while operating and there it is in the sphenoid sinus." The interesting point was that the end of the instrument could be lost in the sinus in that way without inducing any particular symptoms; but of course there was free drainage.

W. L. Howard, Memphis, Tenn.—About ten years ago I had a case referred to me. A little child about six years old came with a small abscess on the side of the nose. The history: While out hunting, and sitting on a rail fence, the top rail fell off and threw him into a little patch of cane. Where it had been cut at an angle, the tops of the cane were sharp, and one of the canes had struck him in the face. It was about a month previous. It had abscessed and he had a marked divergent squint and could not rotate his eye inward. I removed a piece of cane and thought I had cured my patient. He went along six months, but the eye did not improve. There was no inflammation or abscess for six months. Then he developed a second abscess on the side of the nose and came back to me. I made a thorough explanatory incision and tried to find some more cane there. I could not find any. After I opened the abscess and cleaned it out thoroughly it healed entirely, and still the squint in the eye did not improve. One year later he came back with another suppurating abscess at the outer angle of the nasal bone. With the speculum I could see the point of something. Near the middle meati I extracted a piece of cane two inches long. Whether that was in the sphenoidal sinus I do not know; it was there somewhere. After that his eye improved.

Wm. B. McClure, Lexington, Ky.—I had an experience some time ago while doing an operation. I was using an instrument made by Fowel that had a tip on it that was riveted on instead of being a solid part of the instrument. On withdrawing the instrument I found that the tip was gone. The patient was a sot and could not take further anesthesia. I assumed that the tip was in the nostril, because I had gone through its

floor. I closed the wound, intending in a day or two, when the patient recovered sufficiently, to remove the tip through the nostril. The patient went into a state of delirum and died within twenty-four hours. I am today having a case in court because of the tip in the patient. The point is, here is a suit for malpractice for me. I think there is nothing in the world in the case; it is purely a holdup. It shows what kind of trouble we can get into. This was an instrument never before made. Fowel first made these instruments, with the points not solid, but riveted on. The surface was thin and probably just a little shoulder caught.

R. W. Bledsoe, Covington, Ky.—I was very much interested in the doctor's paper. While he was reading it I recalled a case I saw about 12 years ago. A boy, 16 years old, was playing in a vacant lot, in which the weeds had recently been trimmed, and in some way he fell forward to the ground. His nose began to bleed a little bit. He went home and washed his face, and thought nothing more of it. I do not recall how long afterwards it was that I saw the case, but it was several days. However, here is the important thing that I do remember. Some days later I was called in and saw the case at the home of the child, and the history of having nose bleed was told me. I couldn't see anything abnormal in the nose, so I had the child brought to the office. At that time, as I recall it, the child was very sick and had to be brought to the office—the details are not very clear to me now. Anyhow, upon examining the nose carefully I was almost at the point of saying, "There is absolutely nothing wrong here," but way up in the vault of the left nostril I saw a very small yellowish-black spot. Thinking at first it was a speck of soot I tried to wipe it off, and immediately recognized a foreign body. Upon touching it with a probe a severe pain was elicited. With a pair of forceps I brought out a blade of grass or weed, very narrow, more like a blade of hardened grass, 1 3-4 inches long, in diameter not greater than that of an ordinary pin. The child died in a few days of meningitis. In all probability it punctured the cribriform plate and passed right up into the brain. It simply shows what may happen in some apparently very insignificant injuries.

Dr. Nelson.—I enjoyed very heartily the discussion. Thank you, gentlemen.

THE TREATMENT OF HIGH PRESSURE DISEASE.*

By Stewart R. Roberts, M. Sc., M.D.,
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The vascular system is a closed system, and is therefore a unit in maintaining blood pressure. A rise in the pressure increases the work of the arteries, kidneys and heart. An increase above normal limits marks the onset of high pressure disease, which is the association of high blood pressure with a progressive degeneration of the vascular system. High pressure is not merely a symptom, but a disease of manifold causes, of pathological changes in the vascular system, and of variable clinical symptoms. It is a cardio-vascular-renal picture. High pressure is the mechanical force that causes these changes, and holds these organs in this progressive pathological association. Each of these three anatomical factors progresses along a morbid avenue peculiar to itself alone, but the pavement on each of the avenues is high blood pressure. The arteries may suffer atheroma, sclerosis, calcification, weakness and rupture; the kidney may suffer sclerosis of the arterioles, atrophy of the glomeruli, fibrosis and contraction, a vascular nephritis; the heart may suffer high pressure hypertrophy, valvular incompetency, myocardial degeneration and dilatation. A permanent pressure over 150 mm. is the beginning of the disease.

It is a chronic degeneration of increasing mechanical strain, and capable of division into periods corresponding in order both as to severity and to time.

1. The period of high pressure with or without atheroma and sclerosis. After a suitable time the vascular system feels the burden of maintaining the increased pressure and this introduces the

2. Period of strain, characterized by a continuation of the high pressure and in addition a group of clinical symptoms, such as vascular, renal, cardiac, nervous, respiratory, digestive and weight symptoms. This continues until the

3. Period of failure, characterized by (a) vascular failure as apoplexy; (b) renal failure as uremic headache, stupor and coma; and (c) cardiac failure as myocardial weakness, angina and dilatation. The pressure remains high or may increase during this stage.

The degeneration is rarely equally distrib-

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uted, and the symptoms of the period of strain arise first from that organ where the process has been most rapid and the damage the greatest. Unless the patient has had a severe infection or intoxication, the greatest incidence is in those past forty. It increases with age and is often the chief symptom complex of senility. In the aged the picture includes a full habit, splanchnoptosis, and high pressure with progressive vascular changes. Allbutt gave these cases the name of senile plethora.

Just as bad chemistry in the tissues may produce gout, diabetes and various intoxications, so bad mechanics in the vascular system may produce high blood pressure. The first step in the treatment is an inquiry into the causes of the increased pressure, and the lessening or removal of their influence. These causes include gout, lead, obesity and autogenous poisons; certain infections, as syphilis, typhoid, malaria and rheumatism. A life of tension. Physical tension, as manual labor and over-eating; intellectual tension, as the high speed life of many business and professional men; emotional tension, as in the neurotic and in those worriers of the race who live in a tangle of real or imagined distress. The chief causes are syphilis, over-eating, tension and age. High pressure disease advanced to the period of strain is common in the fat past fifty. This is usually the result of over-eating. Less eating, less weight, less pressure follow in order. The mass of food is more important than the quality.

The large meal with the overfilling of the vessels and the rise in pressure is to be avoided. The diet is lessened in red meats and condiments, tea and coffee; but otherwise simple food, simply cooked and well chewed, is all that is necessary. Milk, eggs, fish, chicken, breads, butter, cereals, vegetables and fruits afford ample choice. However even these may be harmful if the mass be too great. A high pressure patient must not be a large eater if he is to improve or to live long.

All cases of high pressure, especially if sclerosis be present, deserve a Wassermann before the iodides are given. There are more cases of prenatal inherited than of acquired syphilis. Even acquired syphilis under the old methods was rarely completely cured, and its selective action on the vascular system appears in patches of atheroma in the ascending aorta and the circle of Willis, in changes in the aortic valves, and in sclerosis of the arteries. We probably overlook more syphilis of the vascular system than we diagnose. High blood pressure, sclerosis, aortic leak, palpable epitrochlear glands, inequality in the size or unevenness in the circumference of the pupils form a clinical scene with syphilis looming large behind.

The personal habits are worthy of detailed consideration. The pressure falls and the heart stores away reserve power with rest and sleep. The bed and sleep are vaso-dilators of certain action, and eight to ten hours are well spent in bed. The bowels are to move freely daily. Salines are advisable because thin movements prevent overdistension of the vessels, and aid the kidney if vascular nephritis exists. Epsom's salts, in a three to one ratio with cream of tartar, or Rochelle's salts, are agreeable variations. The dose is from one to two drachms daily, taken in a saturated solution before breakfast. Tobacco is used sparingly or not at all. Cigars and chewing are bad as these tend to raise the pressure. Cigarettes tend to lower pressure, and may be recommended if abstaining is refused. Alcohol is omitted.

The brine baths of Nauheim reduce the pressure and are especially indicated if the renal symptoms are marked. Patients can take them in their own homes with but little expense or trouble. Eight pounds of coarse ice cream salt and two pounds each of calcium chloride and sodium bicarbonate are dissolved in an ordinary bathtub two-thirds full (about forty gallons) of water at a temperature of 95 to 100 F. The patient bathes at bed time, and remains in the water from ten to twenty

minutes. Every fourth night is omitted and the baths are taken in series of ten, twenty or forty baths if the symptoms are pronounced and the pressure remains high or increases. This is not the carbonic acid bath, which actually raises pressure and does harm to a vascular nephritis. The temperature must be 95 degrees or higher, because cold or tepid baths raise the pressure. These brine baths reduce the pressure by relaxation of the muscles, dilatation of the arterioles and capillaries, and increased elimination through the skin and kidneys. Inasmuch as people bathe anyhow, their baths may thus serve a remedial purpose.

If the renal symptoms be prominent, the afferent vessels of the cortex and the glomeruli are at fault. This is a true vascular nephritis, known of old as an interstitial nephritis or the arteriosclerotic kidney. The blood pressure may be high and the only urinary changes be increased quantity and decreased specific gravity, or with the classic changes in the urine. In either event the pheno-sulphothaleine test or "red" test will show the real functioning power of the kidneys. Palmer, of Boston, has shown that in nephritis the urinary acidity is increased from five to ten times the acidity of normal urine. Drachm doses of the salines counteract this abnormal acidity, decrease the urinary symptoms, and with the brine baths and accent of milk in the diet, control the renal tendencies and reduce the pressure. I have used this alkali treatment for five years in one case with excellent results.

Bleeding is the surest way to relieve very high pressure and to control such symptoms as throbbing in the head, heavy headedness, pounding heart and uremic onset. It is unwise in the thin, the anemic, the aged and during weakness from any cause. As a rule it is not indicated unless the pressure is over 200 mm. The patient should be in bed from one to three days before the operation, and remain in bed for a few days after. The circulation has been at a high altitude, and after bleeding it must accustom itself to a lower level. A fall of 50 mm. is permissible, and the pressure should be taken before and during bleeding. The tightening of the cuff on the arm causes a free flow at the elbow, and the reading indicates when the flow should stop by the fall in the pressure. The guide is the amount of fall in pressure rather than the amount of blood withdrawn. The operation may be repeated at intervals and pronounced arteriosclerosis is not a contraindication if other factors permit.

High pressure is influenced by those drugs able to reduce pressure and capable of being given over long periods of time. Their action must continue from one dose to the next and not be evanescent. The present 10 per cent tincture of aconite, sodium nitrite and sodium iodide meet these conditions. The dose of the aconite is from 5 to 15 drops daily, and of the sodium salts 2 to 5 grains. With simple high pressure without sclerosis or with the arteries far advanced in the sclerotic process, this prescription acts well:

Sodium Nitrite, 4 drachms.
Tinct. Aconite, Aqua a. a. q. s., add 1 oz.
Sig. 5 to 10 drops in water t. i. d., p. c.

Of the iodides, the sodium salt is preferred, as it contains as much iodine and has none of the objections of the potassium salt. It is added to the aconite in those cases of high pressure with threatened or advancing sclerosis.

Sodium Iodide, 4 drachms.
Tinct. Aconite, q. s. ad 1 ounce.
Sig. 5 to 10 drops in water t. i. d., p. c.

The factors to be reached by this medication include the vessel wall, the vessel bore, the overworked heart. To influence all three is to safely and slowly lower the pressure. Sodium iodide lessens the rapidity of the sclerosis, and indirectly prevents a further rise in pressure. Once thickening of the vessels has occurred, it cannot be removed, but the process may be halted. Sodium nitrite is the most permanently acting of the amyl series.

It relieves arterio-capillary spasm, increases the bore of the vessels, lowers the pressure, and relieves the heart by decreasing the resistance encountered by the systole. Aconite slows the heart and lessens the load imposed by the high pressure. It can be given over long periods without danger. It tends to relieve the throbbing head and ringing ear of the high pressure patient, produces a sense of calmness and aids sleep. High pressure puts more work on the entire circulatory system and aconite gives calmness and poise to an overworked mechanism. These prescriptions or their variations may be given at intervals or continually with safety. The idea is to reduce the pressure as much as age, compensation, sclerosis and other factors will permit. And even if the pressure is not reduced as much as is desired, at least the vascular strain can be decreased. It is true that in certain patients, chiefly the fat and the old, it is either impossible or unsafe or both to reduce the pressure. Such patients rapidly pass into the period of failure.

The treatment during the period of failure resolves itself into the treatment of terminal conditions. For the kidney these include a closing nephritis, uremic symptoms and renal failure; for the heart a failing myocardium, angina, broken compensation, dilatation, dropsy and a long list of lesser symptoms; for the vessels, advanced sclerosis, intermittent claudication, apoplexy and an innumerable number of lesser complaints, as numbness, tingling, cold hands and feet, weariness, insomnia, headache and failing vision. Soon or late the curtain falls, but the lower the pressure in safety the longer the life.

DISCUSSION.

Dr. Robert Wilson, Charleston, S. C.—Our knowledge of high pressure conditions is not yet such as to justify us in being dogmatic in our expressions, but I am inclined to take issue with Dr. Roberts in his opinion that high pressure is a disease per se rather than symptomatic. We may consider some of these cases as dependent upon disease of certain of the internal structures, especially of the suprarenal glands. Bernard, and other French investigators, have recently demonstrated cases in which this is true, the condition being analagous of that which depends upon thyroid disease and disease of other organs of internal secretion. In the majority of other cases, high pressure is a conservative compensatory process. In cer ain instances there is a narrowing of the arterioles mentioned by Dr. Roberts, when the high pressure is for the purpose of overcoming the embarrassment created by the narrowing of the lumen of these arterioles and so supplying the tissues and organs with an adequate amount of nutrition. In renal cases perhaps the high blood pressure represents an effort on the part of nature to secure a better elimination of the toxins. Possibly in other instances the high tension may depend, as has been suggested, upon increased viscosity of the blood, depending in turn upon the increased acidity due to the absorption of products of metabolism or of toxins. In any case high blood pressure represents an effort on the part of nature to overcome certain difficulties created; in other words, it is a compensatory process. It is symtomatic of conditions which exist and is not **per se** a disease. Whether or not the long continuance of high blood pressure of itself is sufficient to cause organic disease in the blood vessels, may be open to question. Personally I am of the opinion that organic disease can be so produced, but this opinion has been questioned recently by good authority.

The treatment of high blood pressure is based upon this conception of its cause, and our chief effort is to bring about the elimination of toxins, along lines which were clearly and well laid down by Dr. Roberts. In many cases this is all that is necessary. The regulation of the mode of living, the regulation of the diet, securing normal and proper elimination through the alimentary canal and other organs, are in many instances sufficient to keep the high pressure within proper limits, or to reduce it if it is exaggerated. If nature has produced high tension for the purpose of overcoming certain difficulties which exist, we must be careful not to reduce the pressure too far.

Dr. E. C. Thrash, Atlanta, Ga.—I want to call attention to one thing Dr. Roberts did not mention, and that is the vascular crises associated with this disease, and I would like to say, I am sure Dr. Roberts does not mean to call this a disease, but a symptom complex. I know him quite well and am familiar with his work, and he simply speaks of it as high pressure, not as a disease, but as a symptom complex. The vascular crisis is a condition or process accompanying this disease, which we have not understood as thoroughly as we need to understand it. We not only have vascular crises in the heart, but in other organs, in the abdomen, in the legs and head, and wherever it does occur it brings about a spasmodic contraction of the vessels producing pain. This is one of the very commonest sources of pain, namely, a spasmodic contraction of the vascular system, and the vascular system being irritated under high tension, having a strain upon it which it can scarcely sustain, naturally it would be more susceptible to spasms and crises than the vascular system would be in normal states. It is not possible to have high tension without thickening and stiffening and narrowing

of the lumen and lack of resiliency of the vessels. When this condition comes about it is the beginning of the trouble. The disturbances of the heart and the kidneys come on later, and we read from our text-books and hear men talk about the heart, the kidneys, auto-intoxication and one thing and another being the cause, but I have noticed in alcoholics this high pressure, and also in men who have never drank at all. I see more cases of arteriosclerosis and diseases of the vascular system among people who do not drink than I do among people who do drink. I find it in the hard laborers more often than in drinkers, men who do hard manual labor, haul coal, carrying brick and work of that kind. That seems especially to predispose to it, but the real source in my opinion is syphilis. And since the institution of the Wassermann test, I have decided, as I think other men who have studied the subject have, that there are about ten times more people suffering from this disease, either in the mild form or tertiary syphilis, than we dreamt of before.

If I were going to mention the treatment, par excellence, of this disease, I would say depletion, especially to relieve the crises and painful depression and conditions where immediate relief has to be brought about. I would bring about depletion by salts and by bleeding. Salts evacuate the bowels and deplete by bleeding into the alimentary tract. That is by exosmosis the serum passes from the vascular system into the alimentary tract.

Dr. Louis Leroy, Memphis.—The subject of arteriosclerosis and high pressure symptoms I believe has two phases, or two degrees that need to be considered. The first is the vicious circle produced by the second or perhaps my order is reversed, or by excesses. Excess in almost any direction may result in the starting and maintenance of this strain of vicious results. I believe that there is more in attacking other points of the vicious circle than in attacking pressure itself. I believe that the high pressure **per se** is only one small point, and that it is only perhaps in the case of apoplexy that the real danger of high tension alone makes its appearance. I believe that in the general handling of these high pressure conditions too much attention is paid to the shpygmomanometer, and blood pressure reducing per se gets the credit for the benefit which has accrued from the regulation of the excesses which produced the disease primarily. In other words, we will give iodides, aconite, nitrites or nitroglycerin, and then regulate the diet, increase the purgation, watch elimination and make a man cut out half of the hard work, make him sleep better, relieve his tension in other ways, and we give credit to the aconite and iodides. I believe it is a case of misplaced confidence in the drugs. There are times unquestionably when temporary high blood pressures occur; they vary and run up high for days or at times. When cerebral symptoms make their appearance, with a tendency to fainting occurring, when the cardiac symptoms are troublesome for a few days, symptomatic remedies, all blood pressure depressants, or bleeding are beneficial, but we tend too much to give these blood lowering remedies credit for what hygiene does. In trying to compensate by increased pressure for deficiencies elsewhere, we may do good in lowering pressure directly. The high frequency current of electricity I have seen do considerable good in holding down for some time, if applied daily, the arterial tension. I believe the next few years will begin to show some valuable statistics in the effect of radio-active substances in lowering the general tendency to over-arterial tension or over-response to these excessive irritants or excesses, whether it be eating, working or reading. Recently I have seen some reports that were quite startling from the use of radium intravenously in this line, and statistics definitely accumulated will be worth something, but always with the idea that fundamental conditions, more than one symptom, are to be watched, and the one symptom only when it is near the breaking point.

ACCOMMODATION IN THE EYES OF PERSONS ABOVE 40 YEARS OF AGE.

By Dudley S. Reynolds, A.M., M.D.,
Louisville, Ky.

The question of accommodation must be considered in all clinical tests of refraction.

Coincidently with this question comes the question of age. The age at which active accommodation ceases is not easily determined. Donders says, "The correction, by means of positive glasses, in the commencement of the effort of diminished accuracy of vision of near objects, is the characteristic mark of presbyopia." He fixes the time of its appearance at about 45, its maturity at 60. There are so few really emmetropic eyes that it is a safe rule to assume some error of refraction in all cases not clearly made out.

If, in the determination of refraction, and the relative visual acuity, it appears that distant vision is indistinct, and some definite range of accommodation is present, it were best to suspend the manifest accommodation in order to determine the latent aberration, before attempting to decide what lens should be prescribed for near vision; and, whether glasses should be worn for distant vision.

Certain rules and methods of testing must be adopted in all clinical tests in order to make them valuable.

One rule that has few variations is that which discriminates emmetropia from hypermetropia; for, if hypermetropia be present in latent form the results of attempts to aid failing sight with positive glasses will likely prove unsatisfactory. A full correction of hypermetropia under suspended accommodation will hold until presbyopia sets in; and, this may be delayed in accordance with the general health and habits of the patient until past 60 years of age, and much beyond that in high grades of hypermetropic astigmatism.

A. had hypermetropic astignatism=3.50 D. the correction of which enabled him to enjoy freedom from any sign of presbyopia until he attained 64 years of age. At 66 years he added +0.50 D. spherical, and required no further change until his 70th year, when he found his near point receding, and on retesting it became necessary to employ a cycloplegic. It turned out that his astigmatism had diminished, and the formula for his glasses was changed to +2.50 c. 90° +1.00 s. for distance, and +2.50 c. 90° +2.00 s. for near vision. I have found many such cases.

In fact, it may be stated as a rule to which there are few exceptions that accommodation is present in most persons of vigorous health until about the 60th year of age, excepting of course those who have high myopia or amblyopia.

In a series of more than 8,000 cases of refraction, in private practice, I have noted that, omitting neurotics and cases of paresis, active accommodation is very rarely absent before the age of 60. It diminishes generally between the ages of 38 and 45 years.

In all tests of refraction it is essential to have diffuse daylight, and to use such test objects as may correspond to what the patient needs in his daily life. Snellen's test type, and not some imitation, should be relied upon, excepting in such cases as architects, engravers and other artisans.

Dr. Alexander Duane, of New York, has made an important contribution to this subject. His labors in this field consist of carefully conducted experiments in about 1,500 selected cases. His test object is a single black line 0.15 mm. in diameter, engraved on a dull white card, mounted on a disc of black velvet. Having fully corrected any existing error of refraction, the object was placed before the eye and moved gradually up to the nearest point at which the line could be distinctly seen when held vertically. In this way the normal near point was established. His cases were all rendered emmetropic before the test was made.

He has been able in this way to establish the normal accommodation curve for different ages. His findings are valuable. It is apparent that accommodation rarely begins to diminish before 38 years of age in vigorous persons.

(Transactions Section on Ophthalmology A. M. A., 1909, page 57. Also 1912, page 383.)

Now, to return to the clinical tests in daily practice, I would suggest the importance of having not only Snellen's test types, but a fixed distance of six meters in a well-lighted room. The trial case should have every one of its lenses corrected by some refraction test, Snellen's Phakometre being the best, None of those devices which measure the curvature of the surfaces of a lens are of much value, because they cannot be relied upon to establish the exact refraction of the lens or the axes of its cylindrical surfaces.

In making tests it should always be done with lenses and test objects graded in the same system of notation. If, for example, we use metrically graded lenses, and Snellen's test type, we must observe metrical units in fixing the various distances and in recording results.

The test for parallel light has been fixed at six meters, and the type used is so graded as to be seen under an agle of five minutes or some multiple of that angle. It will not do to make tests of refraction for parallel light at any other distance. If, for example, we take the object graded for five meters or any shorter distance we lose the value of the

illumination test—positive infinity—or parallel light.

I had intended to present an analysis of about 8,500 cases, but the classificaton of this immense mass of clinical records proved beyond my capacity in the twelve months within which I have spent most of my spare time at the work.

DISCUSSION.

J. W. Jervey, Greenville, S. C.—I enjoyed hearing Dr. Reynolds' paper very much. I think all of us have observed the slowness with which presbyopia appears in a great many cases. In fact, most of us have been in the habit of following a fixed rule that presupposes that presbyopia is present always at the age of forty years. Of course this is a mistake. At the same time I feel, without some little care, Dr. Reynolds' paper may be calculated to bring us into a little trouble if we followed out the intimation he appears to give us. In other words, his position seems to be this, that seldom or never is a large amount of presbyopia present in an eye of forty years, and that as he has observed presbyopia in some cases is not complete, the relaxation of the accommodative apparatus is not complete until the age of sixty years, it is wise we should use a cycloplegic in all cases, even though they may be over forty years. I think that is rather dangerous doctrine. Personally I would not like to use the cycloplegic in persons over forty years unles there was some very marked indication for it outside of the general belief that presbyopia does not appear complete before the age of sixty. I would like to ask if a cycloplegic should be used to determine if there were errors even in cases of forty or fifty years.

J. T. Herron, Jackson, Tenn.—I think the doctor's paper is a very timely one. I think if we did as he has suggested we would get on the right track. As many of you know, many years ago the American Association established the rule that every patient should be examined with a cycloplegic under forty-five years old. I have made it a rule to dilate every eye that has hypermetropia under forty-seven. I do not know that it is necessary to dilate any over forty-seven. But I have found in many cases we have to allow something even in fifty-four or fifty-five. They have a great deal of straining power. I had that tested in a man I gave a glass, age fifty years. He came again at fifty-four or fifty-five. I had to add considerable for his distant vision. I made a correction of his glasses several years before that. The only way I accounted for it is that the ciliary muscle had ceased to act at fifty-five years old. I do not think the doctor said we should use the cycloplegic up to sixty. We may cause a glaucomatous tension if we use too much. I find it satisfactory up to forty-seven or forty-eight years old. I do not use any beyond that.

Chairman U. S. Bird, Tampa, Fla.—In my own experience it used to be my habit to refrain from a cycloplegic at a certain age; I have lately been in the habit of using a cycloplegic up to fifty years, if there was much distress.

Dudley S. Reynolds, Louisville, Ky.—It is remarkable how difficult it is to state a fact to a number of persons so as to make them all understand it the same way. I thought above everything I was particularly happy in stating that, where it was apparent there was some latent hypermetropia the cycloplegic would have to be used. But if you take a patient sixty years of age who has normally acute perception, and whose near point can be made to approximate the normal, and whose range of accommodation is still not subject to his control, an exact determination is not necessary, there is no use of thinking about a cycloplegic in such a case. The point I make is, a very large proportion of good, healthy, vigorous people go to sixty before such a degree of presbyopia exists as to make it perfectly clear there is latent hypermetropia. The determination of the near point in the test is one of the most important points to consider. In determining the axis of astigmatism, the various optometers are all toys. The dial of radiary lines is equally useless. If you take pains and conform to rule and be sure you have correct testing instruments, and proper daylight to make the tests, and observe one eye at a time, and by varying the test object, make sure the patient chooses the same lense each time, in several trials, you know then you have not made a mistake. If you do this you will find there is a considerable degree of accommodation in persons of sixty, and even more, as in the case cited. I have a friend seventy-one who has no myopia, none at all, and who until two years ago, when he was sixty-eight, read without glasses. He never had worn glasses up to that time. He has been a banker, a business man, a capitalist, a manager of some kind of active business, being president of an electric light plant, a street car company, a cement manufacturing establishment, and, until he was sixty-eight he had no use for glasses to read. Of course he was not a great reader; he read the papers and magazines, and such things as intested him, and was able to affix his signature to documents and look over accounts without any trouble.

Notwithstanding all this he has, within the past year, developed an inability to see 6—vc Snellen without a 1.00 D. glass. His sight is equal to 6—vc, according to Snellen's scale, and that is the only scale to consider. It is the test relied upon by the United States Pension Bureau.

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Next Meeting, Richmond, Va., Nov. 9, 10, 11, 12, 1914.

EDITORIAL DEPARTMENT

THE RESPONSIBILITY OF THE JOURNAL.

Readers of this JOURNAL who find views from which they seriously dissent expressed in an "original article" will please remember that the editors are not responsible for any opinions or statements given by contributors. The editors publish chiefly the papers read before meetings of the Southern Medical Association, and these are generally accompanied by reports of the discussions which reflect the general views of the Association. Articles are also accepted from members of the Association that are presented between meetings, as well as papers of unusual value offered by men of national reputation.

These are all subject to acceptance or rejection by the publishing committee, which seldom returns a paper unless it shows great lack of merit, or is personal or self-advertising in character.

Accepted articles are carefully read by the editors for the purpose of correcting minor errors or eliminating obscurities, as well as guarding against matter that might be construed as advertising of some sort, inadvertently expressed by the writer. Beyond this the editors do not interfere, and they decline to be responsible for any errors in diagnosis, pathology or treatment advocated by their correspondents and contributors.

Only in the editorial department do they express their own convictions and policies.

PURE MILK.

From a domestic point of view no subject is more important than that of securing pure milk and cream for the inhabitants of our towns and cities.

For millions of infants and children it is literally a matter of life or death, and typhoid fever in people of maturity is traced more often to infected milk than to any other cause. It is no wonder therefore that the medical

profession is so earnestly studying the problem, and that health officers in every locality seek to provide the most practical regulations for securing pure milk and cream by controlling the sale of such products to citizens who must depend upon public dairies for such supplies.

At the meeting of the Southern Medical Association, at Lexington, Ky., last November, Dr. William A. Evans, the well known health expect of Chicago, presented a very valuable document upon this subject which, with the discussions thereon is printed in this number of the JOURNAL. It is entitled, Second Report of the Commission on Milk Standards Appointed by the New York Milk Committee.

This article, which applies to every locality in the United States as well as New York, should not only be read by every county, city or town health officer in the country, but they would do well to consult it regularly as the latest and highest authority upon the subject. It contains the result of years of study and observation by experts condensed into a set of statements and rules which clearly and precisely describe the conditions that should surround the production and delivery of a milk supply and that insure their enforcement. Not an item is neglected. The meaning of every term is defined. The number of bacteria permissible to the cubic centimeter, the chemical conditions required, the proper temperatures for pasteurization, for transportation, for delivery and for domestic preservation are specified. Stables, employes, facilities, water supply, utensils, breeds of cows, food, tests, management, licenses, bottling plants and storage are a few of the items carefully considered. Such an article cannot be represented by extracts, nor can it be adequately described. It can only be mentioned, but that in terms of highest praise. No higher authority on the subject of public milk supplies is in print.

Two other papers, with the discussions thereon, of importance on the subject of "Pure Milk" are also published in this number of the JOURNAL, one by Dr. J. H. Landis, City Health Officer of Cincinnati, entitled "Dairy Inspection in Cincinnati," and the other by Dr. R. M. Allen, head of the Kentucky Food and Drug Department and President of the American Pure Food League, entitled, "The Sanitary Milk Surveys in Kentucky, Some Facts, Methods and Results." These papers show the methods of milk inspection that are in practical operation in the city of Cincinnati and in the State of Kentucky. Every city should enact and enforce ordinances for the protection of its inhabitants from the dangers of impure milk. Physicians, particularly those who are interested in public health work, should initiate legislation in their respective cities and towns for pure milk before hot weather begins. The articles in this number of the JOURNAL provide "campaign thunder" for such a movement. Doctors know that children are dying because of impure milk. This phase of the subject was thoroughly discussed in the March number of the JOURNAL by no less an authority than Dr. H. E. Tuley, of Louisville, in a paper entitled, "Milk in Its Relation to Infant Mortality," which was read and fully discussed at the Lexington meeting. Doctors also know that typhoid fever and other diseases are disseminated through that medium, and they should give this information to the laity in an organized effort to awaken the public conscience to the point where city officials will be forced to provide laws and means for pure milk in their respective localities.

THE U. S. PUBLIC HEALTH SERVICE AND THE ANTI-MALARIAL CAMPAIGN.

The JOURNAL has received Reprint No. 160, issued by the U. S. Public Health Service. It is entitled, Malarial Fevers, Prevalence and Geographical Distribution in Arkansas. By

R. H. von Ezdorf, Surgeon U. S. P. H. Service, January, 1914.

Arkansas is one of eight States in which this survey is being prosecuted under the direction of Dr. von Ezdorf. Its thoroughness and extent are partly indicated by the following items: Every month 12,000 printed postal cards are sent to the physicians in the States under observation to secure information concerning every item pertaining to the malarial conditions in the several localities.

Specimens of blood, or blood smears, are procured or requested, from every county, and vials are distributed for the capture and transportation of mosquitoes. Classes of school children are taught to look for mosquito breeding places and to distinguish anopheles larvae from other species.

A malarial index is constructed for each locality based upon information thus received. Lectures are delivered to the public and to the schools at the principal points under survey. During one visit to North Carolina blood smears were secured from 3,264 persons from seven different points in the State, which illustrates the popularity of the work.

The Public Health Service undertakes these surveys only under the auspices of the several State Boards of Health.

The fact that the General Government is taking a hand in the undertaking to eliminate the malarial element from our civilization is a great encouragement to those who have for so long a time been battling with this gigantic incubus on Southern prosperity. It brings the possibility of success within the range of this generation. Moreover, it is a fact beyond cavil that the U. S. Public Health Service has placed the right man in charge of its malarial work, because Dr. von Ezdorf is one of our recognized authorities on malaria, and his whole soul and heart are in this campaign against the South's greatest enemy. He is also one of the enthusiastic members of the Malarial Commission of the Southern Medical Association.

SAVANNAH TAKES AN IMPORTANT STEP.

On Tuesday, June 9, examinations will be held at Chicago, Ill., Cambridge, Mass., Washington, D. C., and Savannah, Ga., for the position of "Food Inspector for the City of Savannah, Ga."

The examination is open to any one in the United States, will be identical at each of the four cities specified, and success will depend upon qualifications alone.

The term of office will be three years and the salary two thousand dollars per annum. An advertisement on another page of this JOURNAL affords additional information. The position will be free from all outside influence, political or otherwise, and the right person will have an unusual opportunity to demonstrate ability as well as to do good. Dr. W. F. Brunner, of Savannah, is "Recorder of the Board of Examiners." He is well and favorably known as City Health Officer of Savannah and Secretary of the Board of Sanitary Commissioners of that city.

He is ably and enthusiastically assisted by Dr. Victor H. Bassett, Bacteriologist in the Municipal Laboratory of the Board of Sanitary Commissioners.

It is to the foresight and energy of such men that Savannah owes the honor and benefit of this advanced and important step in the forward march of progress, a step which leads directly to the attack and destruction of the only bar to Southern pre-eminence in the sisterhood of states, the dread of disease. It needs only the application of sanitary rules by upright, competent, fearless men to make of the South a veritable Eden of beauty, health and prosperity. In this advance Savannah leads, and she will not lack for followers. The South is wide-awake at last. Like the fancied princess, sleeping under enchantment while awaiting the awakening kiss, her hour has come. Prince Hygiene has touched her drowsy lids, the gloomy shadows

of dreaded infections have fled away and the golden gates of Opportunity swing wide for the entrance of Glad Prosperity.

EX-GOVERNOR CUNNINGHAM NOW HEALTH OFFICER OF BIRMINGHAM.

Birmingham, Ala., is to be congratulated upon securing the services of Dr. R. M. Cunningham as City Health Officer. His great ability and wonderful versatility are too well known all over the South to need further mention here.

As physician, surgeon, statesman and orator he has no superior. He has served as Governor of the State, as Professor of the Practice of Medicine in the Birmingham Medical College, has for many years had charge of the medical affairs of one of the largest corporations in the South, commands an immense and lucrative practice and his popularity is phenomenal. His acceptance of the position of City Health Officer of Birmingham is an act of self-sacrifice that demonstrates the reality of his devotion to the altruistic principles he so eloquently advocates.

It is seldom that we see a more perfect example of highest personal ability devoting itself patriotically to the service of the public regardless of self than is shown in this instance, for to Dr. Cunningham the salary is immaterial.

Dr. Cunningham is an active member of the Southern Medical Association and occupies the important position of Chairman of the Section on Public Health in that organization. The JOURNAL prophesies a brilliant and successful administration to the new City Health Officer of Birmingham.

A DANGER PECULIAR TO THE SOUTH.

Only in the South does the custom prevail of employing domestic servants who are present in the house only during working hours, but at night go to their homes in other parts of the town or city. In thousands of comfortable residences the cook considers her wages earned as soon as the required meals are prepared. Then she makes up a liberal package of food, sometimes secretly, often openly, and retires to her distant cabin or hovel to share the spoils with waiting friends. To interfere with this well known custom would cause the loss of a cook, and Southern housewives of today would rather face a far greater pecuniary loss or of provisions than such a catastrophe. Indeed the custom might be tolerated were it not for another ever-present possibility that is too serious to be ignored. It is sometimes the case that the places that are the nightly shelter of colored cooks are characterized by conditions so revolting that it is not safe for the occupants to be admitted to cleanly homes, where they often come in contact with delicate women or little children. The filthy beds, rough, unswept floors, "pallets" whereon dirty children or dirtier men lounge or sleep, the walls shiny with repeated coatings of expectorated mucus, all go to constitute a condition intolerable to think of in connection with cooking. The housewife knows nothing of all this. She sees only the smiling, good-natured, handy cook, dressed in her own discarded garments, and is happy "because she can keep a cook," for even such are not always easy to keep.

But there is another element still more important from every point of view. The gregarious nature of the negro causes constant mingling, and contagious diseases are too often thus communicated. Disbelief in the contagion, or the fear of losing work, prompts concealment, and we have a sudden appearance of scarlitina, or measles, or smallpox, among the school children or in a home before the presence of such a disease is suspected. In Norfolk, Va., a negro doctor named Burke, was fined ten dollars for failing to report a case of smallpox. The case was that of a negro woman employed as a cook. The housewife noticed the eruption, and learning that Burke was her doctor, "called him up to ask what had been the matter." He called it grip,

but advised the lady to have sulphur candles burned in her kitchen.

When she suggested reporting to the health department Burke objected because "your cook would have to go to Craney Island and stay there three weeks." The lady wisely reported the case, and all who had been exposed were vaccinated. Now had the patient been some other occupant of the cook's house instead of herself she would have come to the kitchen of the white family day after day with clothing contaminated with infection.

Under present circumstances such a danger perpetually hovers over countless Southern homes. In Montgomery, Ala., every washerwoman who carries clothing home to be laundered is required to register at the city hall. Over 3,000 women are thus registered and their premises have been inspected. Such inspection should be made at brief intervals, and outdwelling cooks should be similarly controlled.

PHYSICIANS, PRACTICE WHAT YOU PREACH!

Five great propagators of disease are feces, filth, flies, fowls and food. Combined, they have more effect in increasing the rate of sickness and death than can be effected by causes represented by any other initials in the alphabet. And strange to say the doctors, the very high priests to the temple of Hygiene, are too often guilty of carelessness regarding these obscene conjunctions. How many doctors there are who "have not time" to see about having a sanitary privy constructed for the comfort and safety of themselves and their families; whose kitchens are unscreened or run with open doors through which the flies oscillate between open privy and side-table; whose fowls scratch and fatten on the filth behind the privies; whose offices are examples of dust, dirt and disregard of every rule of sanitation. True, our doctors are beginning to awake to their responsibilities, to realize that their examples speak louder than their words. They are learning that the people are beginning to take notice, and that they *must* reform. But why wait to be driven? Clean up, careless doctors, or the "new issue" physicians will overwhelm you with loss and shame. Self-interest and regard for awakening public taste should induce every practitioner to cleanse and beautify his domestic and professional environment. It pays.

WHY THE INTERNIST SHOULD CHARGE ADEQUATE FEES.

It often happens that much surprise is manifested when a considerable sum of money is charged by a physician for some special service. The public has become somewhat accustomed to paying respectable fees for surgical operations without remonstrance, but when an internist, whether he devotes himself to some special branch of medical work, or does a general practice, presents a bill approximating what would be readily agreed to for "an operation" there is instantantous objection. That such a condition is entirely unreasonable can easily be demonstrated. Brilliant as are the triumphs of modern surgery they are based entirely upon the pathology and therapeutics wherein the internist is or should be supreme. It is his proper duty to make the diagnosis and authorize the operation for which the patient willingly pays a liberal fee, and a mistake in his diagnosis may mean more peril to the patient's life than lies in the mechanical part of the operation. When the incision is made and the work is done the grateful patient seldom realizes that it is to the diagnostician he firstly owes his life.

To acquire the necessary ability he has devoted the best years of his life to arduous and expensive study. No other profession demands from its votaries anything like the amount of time, labor and expense before licensing them to begin their life work. A young lawyer, for instance, will be earning big fees three years before the young physician has completed his required clinical course. And

when both are at work the lawyer is expected to charge as much for the work of a few hours in preparing a single document as the internist would receive from the same person for a month of patient, skillful attention, where life and not money was at stake. It is strictly true that the internist is constantly assuming responsibilities equal to those of any surgeon; that his ability to do so and the fortunate outcome result from an investment of time and study and work and actual danger demanded of no other profession, and that the rewards he is expected to demand are generally insignificant in comparison with those customary in another more easily attained and equally patronized profession. An incident occurring in a Southern city some years ago illustrates the point. An eminent lawyer wrote a deed to a valuable piece of property for an equally eminent physician, and charged one hundred dollars "for knowing how to do it right." The doctor paid the bill, but after a time the lawyer became very ill one night and sent for our doctor, who promptly relieved him. When he presented a bill for one hundred dollars there was great indignation. "You were not with me two hours, doctor!" "You wrote my deed in half an hour, Mr. ———, and charged me an hundred dollars." "But that was different!" "Yes, it *was* different. With printed forms, like yours, for his guide, and a certificate of a clear chain of title, like mine, furnished him, any educated man could learn to write such a deed in a day, but it took me years and cost me thousands of dollars to learn how to know what was the matter with you and how to relieve you, and perhaps to save your life. Yes, sir! It *was* different." And the lawyer saw the point.

Moreover, the doctor must devote a very large percentage of his time and ability to the service of people who can pay little or nothing, and though "treasures in heaven" are an excellent investment they are unavailing for current expenses. Therefore he justly requires the rich man to pay according to his ability and allows the poor man the same privilege. The people should be educated to recognize the justice of remunerating the internist on the same principle that is now so generally adopted in dealing with the surgeon. And the internist himself must be the teacher.

INDIRECT ADVERTISING.

When a daily paper publishes a laudatory article about a certain hospital, and speaks of the fact that "the leading surgeons of the town are kept busy in the operating room," that is all right. No discrimination is shown. All are treated alike and in an impersonal manner. But when the article goes on to say that no less than so-and-so-many patients are to the credit of one particular surgeon, describing him as the "leading surgeon," saying that "his patients come from all over the State," and that "his reputation is well known throughout" a certain specified and extensive division thereof, the matter assumes a different character and becomes a most insidious and unfair form of advertising. Such an article appeared recently in a certain city paper, probably entirely without the knowledge or consent of the doctor so lauded.

True, the name of this "leading physician," to whom such a majority of the patients are said to come for operations, is not specified. But in order that there may be no misunderstanding which might cause some one to suffer the pangs of curiosity, the name of a well known and popular citizen upon whom he performed "a trivial operation" is given by the reporter, as well as that of a lady, "a prominent resident of this city." Lest those might not be sufficiently distinctive the names and addresses of seven others, "all these" under his care, are specified.

Curiously enough, no patients are spoken of by this newspaper save those who employed this famous incognito.

Of a verity the newspaper friends of the gentleman have succeeded, locally, in cutting down the tree of medical ethics and driving the

fabled wearer of cloven feet round its stump at a rate of speed that has seldom been equaled and never exceeded. Such an indirect advertisement should be promptly disowned by its supposed beneficiary, and in a manner as public as the offense.

"VIRGINIA'S ROLL OF LIFE AND DEATH."

The above legend, in heavy Roman capitals, forms the center of the front cover page of the Virginia Health *Bulletin* for November, 1913. The pamphlet contains fourteen pages, and is devoted to telling the citizens of Virginia why such health work is necessary, what it will do for the people, and something of what it has already revealed.

Until a year ago no general record of births and deaths, mortality of diseases or their distribution was kept in the State, though a few cities had partial records of births and deaths. It is estimated that during this first year of enforcement of the registration laws, 90 per cent of all deaths and 83 per cent of all births have been reported. This seems to the JOURNAL a very satisfactory beginning for such an undertaking, scattered as are the localities from which the reports must come and varied as are the people who make them. One important item, full of grim significance, is that "the reported death rates among the whites of the State was 11.4, while the rate among the negroes was 19.1," almost, but not quite two to one. A remarkable feature disclosed is the number of children born dead in the State during the twelve months, 2,291, about equally divided between white and colored. During the year 145 persons died of pellagra, and there were 245 homicides.

Altogether, "Virginia's Roll of Life and Death" makes interesting reading for the medical man and the student of statecraft.

JOHNS HOPKINS HOSPITAL, TWENTY-FIFTH ANNIVERSARY.

What promises to be a notable occasion is planned for the 14th of October, 1914, which is the 25th anniversary of the opening of the Johns Hopkins Hospital at Baltimore. There is to be a reunion of the trustees of the Johns Hopkins University and Hospital, the officers and members of the staff, and all teachers and former students, continuing through four days. At the same time it is expected that the lectures on the "Herter Foundation" will be delivered.

There will be various addresses, hospital rounds, demonstrations and other features of interests, including class reunions and a dinner. Dr. Osler will be present and participate in the exercises.

The "Committee of Announcement" includes Doctors Welch, Halsted, Hurd and Kelly. They desire the presence of former members of the Hospital or Medical School staff, and of former students or graduates of the Medical School.

No institution in the world can boast of greater achievements in a quarter of a century than the Johns Hopkins, and the graduates of no other school have made a more enviable record. Loyalty and devotion to their alma mater are characteristics of the Johns Hopkins graduate, and the celebration of the twenty-fifth anniversary will be an extraordinary event in the history of that great Southern medical institution.

ECHOES FROM THE LEXINGTON MEETING.

The JOURNAL presents three excerpts from contemporary medical publications with pleasure and pride, pleasure because they indicate that the excellence and importance of the work of the Southern Medical Association is so widely recognized, and pride because the usefulness of its own efforts to upbuild the organization is so kindly acknowledged.

Its highest ambition has been to receive from the Association its seal of approval. Seldom has a more impersonal undertaking been assumed than that of this JOURNAL when it de-

cided to devote its every resource to the welfare of the Association regardless of profit or loss. That its judgment is justified and that success is not only assured but actually accomplished is indicated by the quotations herewith presented, and which could be paralleled by many others did space permit. The JOURNAL takes this opportunity to thank the editors of these and of other publications who have so kindly mentioned it in their pages.

The editorials which are reproduced were written by Dr. Arthur T. McCormack, of Bowling Green, Secretary of the Kentucky Medical Association; Dr. C. P. Meriwether, of Little Rock, Secretary of the Arkansas State Medical Association and Editor of the *Journal* of the Arkansas State Medical Association, and Dr. W. Burton Thorning, of Houston, Tex., Associate Editor of the *Bulletin* of the Harris County Medical Society. These three eminent physicians attended the Lexington meeting, and are therefore in a position to know just what the Southern Medical Association is and what it stands for. The journals which they represent are recognized as among the best published in the South, and these expressions from such authorities regarding the Southern Medical Association and its JOURNAL are of unusual import.

THE SOUTHERN MEDICAL.

The sessions of the Southern Medical Association at Lexington were the most profitable from a scientific standpoint that we have ever attended. None of the sections were so large as to be unwieldy and yet the splendid interest in the scientific essays was maintained by the kind of discussion that is rare in large meetings. Entirely devoid of politics, the sessions of the Association were the only things of interest and everybody enjoyed them. We feel satisfied that next year at Richmond, Va., there will be a larger delegation from Kentucky to indicate to our Southern brothers how much we enjoyed them and how profitable their meting was to us.

The profession of Fayette County has again earned the gratitude of the doctors of Kentucky because of their entertainment of our visitors. There was a kind of persuasive hospitality that is always shown in Lexington that can be excelled by the people of no other locality; especially to Dr. C. C. Garr, who was the active member of the Committee of Arrangements, should credit be given for the perfect entertainment.—Kentucky State Medical Journal, January, 1914.

SOUTHERN MEDICAL ASSOCIATION AND ITS JOURNAL.

The Southern Medical Association has made the most tremendous progress of perhaps any association in the world. Its growth in membership from 300 to 2,500 in the short space of three years is phenomenal. Nor is the association satisfied with this remarkable showing. It aspires to a membership of 5,000 as a half-way point to 10,000, and then to become, next to the American Medical Association, the greatest association in the world.

The Southern Medical Association in no sense conflicts with state medical societies. It is almost safe to say that every member composing it is also a member of the state society of his own state. The more medical societies a physician is a member of the better for that physician and for the medical profession. Therefore, we most sincerely hope that the Southern Medical Association will reach its 5,000 goal, then go on to its 10,000 goal, and keep on setting goals further along and reaching all of them.

The Southern Medical Journal is a child of the Southern Medical Association, as the Arkansas Medical Journal is of the Arkansas Medical Society, and it reflects credit on its noble parentage. It is clean, progressive, ably edited. Its contributors are among the foremost physicians in the South. In questions of ethics and proprietary medical advertisements, in exposure of quackery, in all efforts for the uplift of the profession and the disparagement of the unfit, it is always and emphatically on the right side.

Dr. Seale Harris, of Mobile, Secretary of the Southern Medical Association, writing of the value of medical journals in building up medical associations, says that Mr. Braun, Business Manager, and Dr. Simmons, Editor of the Journal of the A. M. A., state that 60 per cent of the present membership of the A. M. A. were first subscribers to the Journal, and without the Journal the A. M. A. could never have attained its present membership and influence.

This is true of all state medical societies, and in commending to our readers the Southern Medical Association, it is a natural sequence that we also commend the most excellent Southern Medical Journal.—Journal of the Arkansas Medical Society, February, 1914.

THE MEETING OF THE SOUTHERN MEDICAL ASSOCIATION.

The meeting of the Southern Medical Association at Lexington, Ky., November 18, 19 and 20, was one long to be remembered.

The true Southern hospitality so graciously extended by the citizens of Lexington, individually and collectively, left only the most delightful memories of the trip, and a desire to go again.

The generous attendance by the lay citizens upon the general evening session arranged by the Public Health Committee indicated very clearly the lively and wideawake interest in all matters pertaining to public health.

The meeting was the largest and most enthusiastic in the history of the Association, over 500 of the representative men of the South being present.

The papers presented were of a very high order of excellence, were listened to with the closest attention, and received the very free discussion to which they were entitled. It has been freely predicted in recent years that the South, from a commercial point of view, was rapidly coming into her own. If this prediction is true of business, it is twice true of medicine. The work of the men of the South, in the past few years particularly, on yellow fever, typhoid fever, pellagra, amoebic dysentery, hookworm and other parasitic diseases of the intestines, has been of such a character that it is an honor to be considered as of them, while the work of Bass on malaria struck a note that has been heard around the world.

The very ably edited official organ of the Association—The Southern Medical Journal—is a publication of which we should all feel proud, and one which should reach the desk of every medical man in the whole South. Its advertising pages are clean and free of objectionable matter. Its editorials are remarkable examples of clear thinking and right teaching, and its scientific sections are composed of original articles that are second to none.

It can be said with all conservatism that it prints in each year more good, sound, up-to-date reading matter of particular value to the men of the South than any other journal in the country.

Texas men are not members of the Southern Medical Association in the proportion that they should be. Probably for the reason that their attention has not been called to it, for they are noted for their interest in society work.

Let us all get in and boost Texas for the annual meeting in 1915.

Dr. Stuart McGuire was elected President for the ensuing year, and the next annual meeting will be held in Richmond, Va.—Bulletin Harris County (Texas) Medical Society, December, 1913.

THERAPEUTICS

CAUSTICS.

Caustics, or escharotics, are drugs that destroy the vitality of tissues with which they are in contact, or even the tissues themselves.

The affected area is soon surrounded by, first, intense hyperaemia, then inflammation, and finally the dead tissues are separated from the living by suppuration and the wound heals, leaving a scar.

Some caustics, of which silver nitrate is an example, are self-limiting as to the depth to which their destructive agency extends.

Others, like acetic acid, continue to burrow in their wound until stopped by the application of an alkali.

Some escharotics are capable of being absorbed and causing systemic poisoning. Of these arsenious acid is the most typical example.

Finally, some of them are so extremely painful in operation that they are being used less and less, the knife of the skillful surgeon taking their places. For some purposes, however, caustics are preferable, as in the superficial growths of microbic origin, ringworm, etc.

Into the bites of venomous insects solutions of escharotics are injected to destroy the poison. Permanganate of potash is the leading example of this class.

Nitrate of silver, arsenious acid and permanganate of potash have been considered already. Acetic acid is worthy of more attention than it receives. It destroys the vitality of any germs with which it may come in contact, and also such diseased tissue as may have it applied to them.

For the destruction of warty growths it is superior to nitric, chromic or salicylic acids, and more manageable. The growths are to be saturated with it by application with a small brush or swab, using care to avoid wetting any surface except that to be destroyed. If this be done no pain will be felt until the acid has penetrated the warty substance and reached healthy tissue. Then the burning smart will warn you that it is time to apply the saturated solution of bicarbonate of

soda, which should stand ready for use. Glacial acetic acid is the form used.

The mistake of using trichloracetic acid should never be made. It is unnecessarily destructive, and though promptly effectual, is less manageable.

Chromic acid, liquefied with a few drops of water, is an efficient caustic. It should not be allowed, while in any quantity, to come into contract with sugar, syrup, glycerine, alcohol, tannin, etc., as it may result in an explosive reaction. Its action is similar to that of acetic acid, but slower, and saturation with water, if it tends to continue its action too long, will control it.

POTASSIUM HYDROXIDUM, SODII HYDROXIDUM.

Potash and soda, as caustic potash and caustic soda, are so identical in their action that only one will be studied at present, whatever is said of one applying equally to the other.

Potassium hydroxid is one of the strongest caustics at our command. Under its contact tistues apparently melt down into moist, grayish-black sloughs which heal slowly and leave a deep eschar. Taken internally it is a violent, corrosive poison resulting in contractions of the throat and pharynx and adhesions of surfaces if the sufferer escapes death.

Its equivalent in daily use is the so-called "concentrated lye" which may be found in any kitchen and has cost the lives or caused the disfigurement of thousands of children in every civilized country.

In using it as a caustic adjacent structures should be protected by a covering of adhesive plaster through which a hole, a little smaller than the area to be attacked, should be cut, and accurately adjusted over the obnoxious tissue. The skin should first be moistened with glycerine to prevent the adhesion of the plaster.

When satisfied that the caustic has done the work required of it, the affected area should at once be saturated with strong vinegar, which changes potash into the harmless acetate.

For local applications these caustic alkalis are furnished in grayish, translucent pencils, easily directed.

POTASSA CUM CALCIS.

A more manageable preparation than either of the two under consideration is the potassa cum calcis, also provided in small sticks.

The action of these caustics is accompanied by severe, burning pain, which ceases the instant the alkali is neutralized.

ZINCI CHLORIDUM.

Chloride of zinc is the form of caustic that, combined with arsenious acid, has been used by advertising quacks as a so-called cancer cure.

The dangerous nature of the combination has been amply demonstrated by the disastrous consequences so often resulting.

Chloride of zinc, used as a caustic, should be combined with an equal quantity of wheat flour. If any cuticle covers the area to be destroyed it should first be dissolved by touching it with a wooden rod dipped in stronger aqua ammonia. The same protection with adhesive plaster suggested when other escharotics are used should be employed with zinc chloride. The depth to which it is wished to destroy tissue should decide the strength of the paste and the thickness of the mixture to be applied. When its work is accomplished it should be carefully washed away by dripping warm water over it from a sponge. If it becomes necessary to chemically neutralize any remainder that cannot be removed a strong solution of tannic acid will combine with it in an inert substance.

Caustics are used but seldom now in comparison with the past. The introduction of local and general anesthetics has removed the dread of pain from operations, and asepsis and antisepsis have rendered the knife so safe that where, in past days, a doctor would have removed what he could not cure by destroying it with caustics, he now cuts it out, or has a specialist cut it out for him, and the patient is relieved in a few minutes of what it would have cost painful hours or days to destroy and then heal the wound.

The actual cautery belongs to pure surgery and not to therapeutics, and therefore we will not discuss it.

CORRESPONDENCE

Charleston, S. C., March 5, 1914.

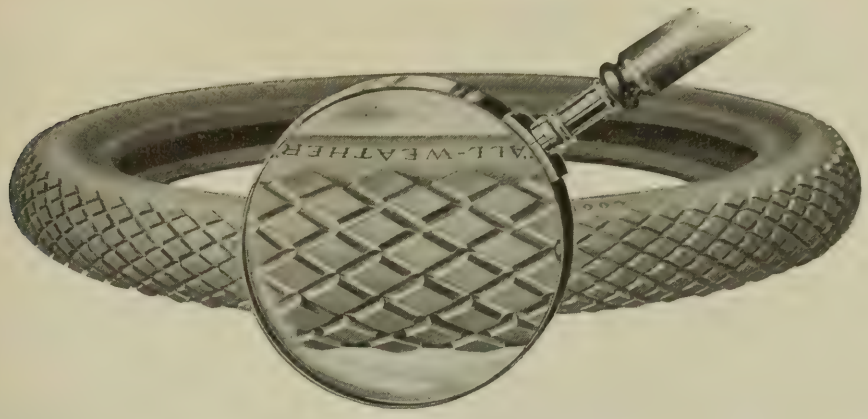
Editor Southern Medical Journal:

We are making an effort at this college to gather a complete record of the alumni since the date of the founding of the college, and as our records here are not perfectly complete, I am taking the liberty of asking you to co-operate with us by publishing in The Southern Medical Journal an item asking all alumni of the Medical College of the State of South Carolina to correspond with me or forward their present address. Any service you may render us will be greatly appreciated.

Respectfully yours,

OSCAR W. SCHLEETER.

Registrar Medical College of South Carolina.



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There are numerous tires now which they far undersell. So the question comes: Is any tire worth more than Goodyears?

The Facts Are These

In several ways No-Rim-Cut tires are the costliest tires that are built. They are so costly that, when our output was smaller, their price was one-fifth higher than other standard tires.

They are the only tires which are final-cured on air bags shaped like inner tubes. This is done to save the countless blow-outs due to wrinkled fabric. This extra process adds to our tire cost $1,500 daily—an extra cost which no other maker pays.

They are the only tires in which hundreds of large rubber rivets are formed to combat tread separation.

They are the only tires made in satisfactory way so that they can't be rim-cut.

They are the only tires which carry our double-thick All-Weather tread.

The Mileage Limit

No-Rim-Cut tires, on the average, give the limit of possible mileage. We say this after years of research and experiment, which have cost us $100,000 per year.

Our experts in these years have made thousands of attempts to build tires that give more mileage. They have tested the new tires against the old in every way they know. And they say that Goodyear tires as made today mark the mileage limit.

Where We Save

We save by mammoth output, by efficiency and by modest profits. Our profit last year averaged 6 1-2 per cent. It is thus we give you tires like these at present Goodyear prices.

Men have bought, in the past two years, more than two million of them. Bought them because mileage records had proved them the best tires built.

It is easy to build tires worth less than Goodyears, but men can't build a tire worth more.

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SOUTHERN MEDICAL NEWS

ALABAMA.

It is said that smallpox is prevailing at Tanner, a station four miles south of Athens. The disease has been largely confined to railroad employes.

At Montgomery applicants for license to practice medicine have been examined by the State Board of Medical Examiners, and during the examination twenty-three graduates of the School of Medicine of the University of Alabama at Mobile were examined. Twenty-two were successful.

Governor O'Neal has appointed Dr. J. T. Searcy, of Tuscaloosa, a delegate to the third annual meeting of Alienists and Neurologists of the United States, to be held under the auspices of the Chicago Medical Society at Chicago, July 14-18.

The published death rates per 1,000 inhabitants for the city of Mobile during January was at the rate of 23.11. This includes people dying in the various hospitals and infirmaries who were brought from other localities.

Montgomery is registering at the city hall all the washerwomen who carry clothing home to launder it. It is estimated that over 3,000 women, almost exclusively negroes, will have to register.

At Birmingham, Dr. George Eaves, Secretary of the Anti-Tuberculosis Association of Jefferson County, is making an appeal for funds to support the work.

Dr. Charles Whelan, city physician of Birmingham, has vaccinated every member of the police force. One of them had been stricken with smallpox and taken to the pest house after intimately associating with a number of his comrades.

At Mobile the School of Medicine of the University of Alabama has employed an all-time professor of practice of medicine and clinical medicine, to take charge of hospital, dispensary and didactic medicine. Dr. J. Howard, Agnew, recently assistant professor of medicine in the Medical Department of the University of Michigan, occupies the position.

ARKANSAS.

Dr. W. C. Smith, of Beebe, has moved to Oak Grove, near Austin.

Dr. Corydon M. Wassell, formerly of Tillar, together with Mrs. Wassel, left Little Rock on their way to Wu Chang, China, where he will serve as a medical missionary in the Episcopal mission.

At Crawford the county judge holds that the State Board of Health is an unconstitutional body and refuses to recognize the county health officers or to pay their compensation.

Dr. Olive Wilson, city health officer of Paragould, has resigned her position and gone to Alexandria, Ind.

At Alma the sheriff has cancelled the tax-collecting dates because there are thirty-six mild cases of smallpox in the town.

Dr. W. R. Owen has been appointed city health officer of Paragould and county health officer also.

At Little Rock, Dr. T. M. Fly, the hookworm specialist, is supplying the needed medicine gratuitously. The superintendent of schools, Mr. D. L. Paisley, is co-operating with him.

Attorney-General Moose, in an opinion addressed to Representative T. B. Friar, of Appleton, says that it is not illegal for physicians to agree upon the fees they will charge for their services.

It is said that there are twenty cases of smallpox in Spadra, a mining town five miles west of Clarkville.

At Malvern, Dr. R. Y. Phillips, county health officer, has appointed registrars and deputies for the township in Hot Spring County, to record births and deaths and to enforce the vaccination law.

The public school at Mt. Holly is said to have been closed because of scarlet fever, and that the Gifford school has been closed because of smallpox. Many cases of measles in a mild form are reported in Malvern.

Dr. George Douglass Dickerson, 59 years old, died at his home in Conway, January 23. He leaves a widow, three sons and a daughter.

At Sulphur Springs, Dr. W. H. Crawford has opened an office in a building opposite the Sulphur Springs Hotel.

DISTRICT OF COLUMBIA.

It is said that the recent executive order issued by President Wilson for the new government of the Canal Zone specifies that an army officer shall be appointed chief sanitary officer. The order is effective April 1.

At Washington, Dr. G. Lloyd Magruder, former Dean of the Georgetown University Medical School, died on January 28 and was interred on the 30th in Rock Creek Cemetery.

Secretary Daniels has nominated Medical Inspector William C. Braisted to be Surgeon-General of the Navy, relieving Medical Director Charles F. Stokes.

The United States Civil Service Commission has announced a competitive examination for the positions of trained nurses for men and women to fill vacancies that may occur in the Indian, Isthmian Canal and Philippine service. The examinations will be held on April 15 in Arizona, New Mexico and Iowa.

FLORIDA.

At Ocala, February 5, Dr. Joseph H. Billingsley, aged 83, died at the home of his son. He was a native of Spotsylvania County, Virginia.

At Jacksonville, Dr. J. E. Lake, of 520 West Adams Street, was robbed of $300 by two unknown men.

At Jacksonville, Dr. C. E. Terry, city health officer, has established a class for the instruction of local midwives. Out of fifteen notified to attend, fourteen complied.

At Key West the work of accurately reporting

(Continued on Page 18.)

What We Do

Everything that a fully equipped chemical, bacteriological and medical laboratory should be able to do.

WASSERMANN TEST,	$5.00
Urinalysis, complete - -	$1.50
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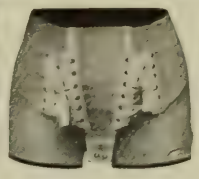

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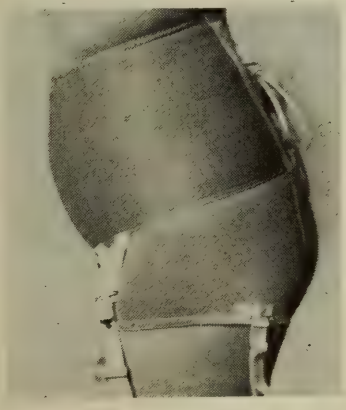

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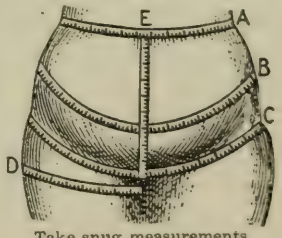

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C—Hips.
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E—Height.

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MEDICAL NEWS

(Continued from Page 16.)

births and deaths has been successfully inaugurated.

The state of Florida and the city of Pensacola take great pride in the fact that the statue of an illustrious Floridian, Dr. John Gorrie, inventor of artificial ice, is to be placed in the statuary Hall of Fame at the National Capitol.

Dr. F. F. Ferris, of Apalachicola, chief surgeon of the Apalachicola Northern Railroad, was seriously injured by his motor car running into an open switch and colliding with engine. First report was that his injuries were serious, but later reports are that he is improving.

GEORGIA.

At Macon the board of directors of the city hospital have named the visiting medical staff for 1914. The staff is virtually the same as last year.

A non-resident of Atlanta has sent his personal check for $500 to be applied to the "city's fight against preventable diseases by caring for black as well as white germs."

At Augusta an alleged negro "cocaine doctor" named William Wilson was arrested for selling that drug. He was caught in the act.

At Fort Screven one entire company of the artillery corps has been quarantined on account of an epidemic of mumps.

Atlanta has inaugurated general and compulsory vaccination. Twenty-five doctors, accompanied by policemen, will tour the city, vaccinating everyone who cannot show a satisfactory scar or prove that he has had the disease.

In the same city an unknown white man, believed to be a medical student, vaccinated several hundred negroes, charging 50 cents each. The city vaccination is done gratuitously.

At Macon the county physician is said to have presented a bill for attending the smallpox patients of the city in January, amounting to $1,850. The bill was referred to the proper committee.

In the same city 80 per cent of the 1,200 school pupils examined during the first month of the medical examination authorized by the Macon Board of Education were reported not to be in perfect health. In the city there are about 1,000 pupils in the public schools.

At Alto there are ninety patients in the state sanitarium for tuberculosis patients. It is said that they show wonderful improvement.

KENTUCKY.

At Morganfield, January 29, Dr. J. T. Shoemaker, aged 75 years, former President of the Ohio Valley Medical Association, and known as the "father" of the association, died at his home.

At Frankfort, February 5, because of the prevalence of smallpox among the members of the General Assembly, the Senate adjourned for an indefinite period. The House followed its example.

At Morganfield, at a meeting of the Union County Medical Association, Dr. Henry B. Allen was elected county health officer to succeed the late Dr. J. T. Shoemaker, who had held the office for more than thirty years.

At Folsomville, Dr. Quincy I. Williams was fatally shot by Ernest Dimett, his brother-in-law, as the result of a family feud.

At Covington eight additional physicians have been added to the staff of St. Elizabeth's Hospital. Their duties commenced March 1, when the new hospital was ready to receive patients.

At Scottsville, in February, Dr. J. E. Pace, health officer for Allen County, was thrown from his buggy in a runaway and sustained painful injuries.

At Clinton, in January, Dr. J. C. McCallum died suddenly of heart trouble at the age of 78 years.

At Louisville, Dr. J. H. Oakley, of the Public Health Service, reports that among 4,558 children in county schools, only 126 positive cases of trachoma were found. In the city schools 450 cases were found among 28,000 pupils.

At Pikeville, in January, Dr. W. A. Campbell was killed by falling with his horse over a steep embankment.

LOUISIANA.

At Shreveport it is reported that Dr. Dowling has closed the Brown Hotel, at Gibsland, the Lecompte Hotel, at Natchitoches, and the Bessie Lee Hotel, at De Ridder, because he considered them insanitary. They had received previous notice to clean up, but disregarded it.

At Many, Dr. D. Harvey Dillon, former president of the State Board of Health, was shot at from ambush as he entered his home at midnight. He was uninjured and returned the fire.

At Thibodaux the local Board of Health has issued a letter to all schools advising that no student be admitted from points in the parish where small pox has been until their homes have been thoroughly disinfected.

Dr. J. B. McMahon has moved from New Orleans to De Ridder.

At New Orleans, Dr. W. T. O'Reilly, chairman of the City Board of Health, reports that during January, exclusive of non-residents, the death rate was only 16.62 per thousand. There were 131 cases of diphtheria and 8 deaths. Measles, 102; no deaths. Typhoid fever, 9; 4 deaths. Meningitis, 5; 3 deaths.

Dr. Robert H. Blackman, of Monroe, has accepted a position on staff of Mayo, Rochester, Minn.

The physicians of Acadia parish met at Crowly in January and organized a County Medical Society with Dr. D. D. Mims, President; Dr. M. L. Hoffpauir, Secretary-Treasurer. Dr. E. M. Ellis was elected delegate to the State Convention in New Orleans in April.

At New Orleans a prisoner in the custody of the United States Marshal developed meningitis while in the parish prison, whereupon the authorities refused to allow him to remain there. After some difficulty a place was found for him in the Charity Hospital.

Dr. Dowling is trying to get the empty building at Royal and Conti Streets as a new home for the State Board of Health.

At Lafayette the physicians have organized the Co-operative Sanitarium Association with Dr. J.

(Continued on Page 20.)

Don't Use Drugs for Constipation
Use the Cracker With a Mission

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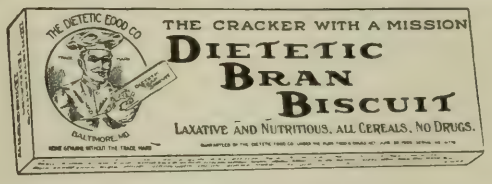

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Water at 100° C.	1.90%	Pentosans and Hemicellulose	6.03%
Protein	9.68 "	Fat	5.80 "
Invert Sugar	1.56 "	Cellulose	3.46 "
Cane Sugar	5.51 "	Ash	5.14 "
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The Ash contains: Calcium Oxyde 0.305% equal to Calcium Phosphate 0.565% of whole biscuits. Nutritive value per pound 1806.6 calories.

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25 CENTS A PACKAGE

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MEDICAL NEWS

(Continued from Page 18.)

D. Trahan as President. The sanitarium will be located near the courthouse.

At New Orleans, Dr. O'Reilley has ordered twenty-seven affidavits against citizens in the uptown district for violations of the garbage can ordinance.

On January 26, in the Touro Infirmary, Dr. J. D. Fulton died suddenly from hemorrhage of the pancreas. His age was 42 years.

MISSISSIPPI.

Dr. M. J. Alexander has resigned as member and President of the State Board of Health. Dr. S. W. Glass, of Lyon, ex-President of the State Medical Association, has been appointed to the membership vacancy. The presidency has not been filled, but will be in the near future.

The Legislature has appropriated $46,000 for health work during the next biennial period. This is some increase over last year.

Dr. C. V. Chapin, representing the American Medical Association, investigating and classifying the work of the different state boards, was with the Mississippi board last week.

Dr. Wellington Locke, a prominent and popular physician of Carriere, died March 5th.

Dr. H. Wood, of Hazlehurst, an aged physician, died January 12th.

The State Medical Association meets in Columbus April 14th.

The city of Greenville, through private subscription, due to the efforts of the Anti-Tuberculosis Society, has established a tuberculosis dispensary and has employed a visiting nurse. This is the first work of the kind to be established in the state.

Meridian has just about completed the first tuberculosis hospital and camp. This hospital is ideally located about four miles from the city, and will be open for patients as soon as ample funds are provided. The buildings are the effort of the Anti-Tuberculosis League, which is composed of all the lodges, churches and labor organizations of the city.

Dr. H. H. Howard, formerly connected with the Board of Health in rural sanitation, has been employed by the Hookworm Commission as foreign representative, and is now in Brazil.

The Bureau of Vital Statistics has finished its first year's work and shows itself to be firmly established.

The Mississippi Anti-Tuberculosis Association is active in supplying literature and advice to tuberculosis patients throughout the state.

The Legislature has provided for a Factory Inspector to be selected by the State Board of Health at its next meeting.

MARYLAND.

At Baltimore the charges of the Baltimore Medical Society against Dr. Howard A. Kelly regarding publicity "sought for ulterior motives" were not sustained.

At Baltimore, Dr. Fred Caruthers suffered acute blood poisoning from having a tooth extracted. He came near dying from strangulation, but was ultimately relieved.

In the $20,000 damage suit against the staff of the University of Maryland Hospital for the allegel unskillful treatment of a broken arm, the judge granted an instruction to the jury that no sufficient evidence had been offered and withdrew the charge.

Dr. William H. Welch, acting President of the Johns Hopkins University, announces that there is no expectation that Dr. Lewellyn F. Barker, professor of medicine, will leave the university, as had been rumored since the establishment of the new endowment.

NORTH CAROLINA.

The health officers of Charlotte have found it necessary to enforce vaccination against smallpox. It has appeared in some of the schools. Over 4,000 vaccine points were applied in a few days. There was no charge for the vaccinations. Those who refused to be vaccinated are compelled to submit and in addition to pay for the cost of vaccination.

The Forsythe County Commissioners have made an appropriation of $150 for a month's hookworm campaign.

At Raleigh, Dr. John S. McKee, city physician, has issued an urgent request to the people that every family should provide thorough vaccination.

SOUTH CAROLINA.

At Greenville the pesthouse was so filled with smallpox victims early in February that no more could be accommodated.

At Columbia the Medical Society passed a resolution offering their services free of charge to the school authorities of Richland County for the examination of school children.

At Manning much interest is shown in the hookworm campaign. It is found that in all ages the infection averages 56 to the hundred. Between the ages of 6 and 18, 90 persons were found infected out of every hundred examined.

In Clarendon County it is reported that 16,000 people have hookworm.

TENNESSEE.

At Trezevant about the first of February the public school was closed because of an epidemic of measles.

At Chattanooga, Dr. W. E. Raht has been appointed superintendent of the Erlanger Hospital, succeeding Miss Weller.

In Giles County the Medical Society has elected the following officers for the present year: President, Dr. James K. Blackburn; Vice-President, Dr. L. E. Wheat; Secretary, Dr. E. C. Freeman; Treasurer, Dr. G. D. Butler.

At Maynardville, Dr. R. S. Monroe married Miss Ella Ousley, January 24. Dr. Monroe is employed at the Industrial School in Knoxville.

At Lexington, Judge N. R. Barnham postponed the February meeting of the Henderson County Circuit Court on account of a local smallpox scare.

(Continued on Page 22.)

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Parts per 1000

Sodium Sulphate	50.005
Magnesium Sulphate	30.971
Calcium Sulphate	2.817
Sodium Chloride	2.503
Magnesium Carbonate	.352
Iron Oxid and Alumina	.016
Silica	.005
Total Solids	86.669

The water was excellent from a sanitary standpoint.

Respectfully submitted,
THE COLUMBUS LABORATORIES.
January 26, 1907. Chicago.

MEDICAL NEWS

(Continued from Page 20.)

At Athens the smallpox epidemic has begun to attack the white people as well as the blacks. Nearly three hundred students were vaccinated in one day.

At Chattanooga a man who has refused to allow his two sons to be vaccinated because vaccination is adverse to his religious belief, has been arrested and bound over to the grand jury in the sum of $250.00. Smallpox exists within two blocks on each side of his house.

At Burleson, Dr. John F. Wilson died at his home after an illness of a few days, of pneumonia. He leaves a widow and several small children.

At Memphis, Dr. R. B. Underwood, a professor in the medical department of the University of Tennessee, has been commissioned as first lieutenant in the medical reserve corps of the United States Army.

News comes from Wartburg that smallpox prevails extensively in the county and that several schools have been closed on that account.

TEXAS.

At Galveston, Dr. O. H. Judkins, of the State Board of Health, pronounces Galveston almost entirely free from hookworm.

At Dallas, Dr. Louis Rosenberg, of the Medical College of the Southern Methodist University, has organized a free clinic and medical dispensary for the poor of the city. It is in the basement of the Neighborhood House, corner Cedar Springs Avenue and N. Harwood Street.

Dr. R. P. Babcock, State Registrar of Vital Statistics, among other items for last December gives 27 deaths from diphtheria and 27 from firearms. There were 34 sets of twins born. There were 12 deaths at over 90 years and one at 100. Four white children died from poliomyelitis.

The Monthly Health Bulletin issued by Dr. Babcock for the health department has proven immensely popular. In one county alone 75 per cent of the citizens read the Bulletin.

The Texas Association of Life Insurance Medical Directors met in annual convention at Dallas in the Georgian Room of the Adolphus Hotel, in February. Dr. W. A. King, of San Antonio, and Dr. J. M. McCutchan, of Waco, were elected President and Vice-President for the ensuing year, and Dr. M. M. Smith, of Dallas, Secretary-Treasurer.

Dr. F. M. Hale, formerly of Ballinger, has moved to Temple.

The Tarrant County Medical Society has sent a letter to the city commissioners through the press holding the commission guilty of negligence in not investigating the source of typhoid fever when it appeared in October. The physicians charge that poisonous milk is the source and that the commission, though apprised of the fact, has continued to permit its sale.

VIRGINIA.

At Norfolk a colored doctor diagnosed smallpox as grip. When his attention was called to the eruption he advised against notifying the authorities. Two other colored doctors have been cited to appear in police court to answer similar charges.

E. H. Hendrix, a "ginger-colored negro doctor" from Norfolk went to Elizabeth City, N. C., and advertised himself as a "conjure doctor." He got many customers. When arrested he was engaged in taking the "devil' out of a feather bed. He had ripped the tick open and was beating the feathers about the room. Both officer and prisoner were well feathered when they reached the station house.

The Richmond Dispatch announces that when the Medical College of Virginia and the University of Virginia have completed their merger the Carnegie and Rockefeller foundations will place from one and a half to two million dollars at the disposal of the institution. Latest accounts indicate serious difficulties in the way of the merger.

At Richmond, Dr. Richard Galego Crouch, an honored physician and Confederate veteran, died at his home on Franklin Street, January 27, aged 85 years. His funeral was attended by details from several camps of Confederate veterans.

In Richmond, early in February, nine new cases of smallpox were discovered in one colored family and removed to the pest house. Two of the girls were house servants in South Richmond.

At Norfolk it is stated that smallpox is assuming a more virulent type, several appearing of the confluent type. In the police court, on complaint of the city health officer, Dr. Brooks, three white men were fined five dollars each for refusing to be vaccinated. Following the disposal of the case Dr. Brooks suggested that all of the spectators who filled the courtroom be subjected to vaccination, whereupon the police rounded up some thirty or forty men and women, principally colored, who submitted without a protest.

At Suffolk vaccinations have been made at many of the large manufacturing plants, where hundreds of laborers are employed. At present there are but few cases of smallpox in the town.

At Richmond the House Committee on Finance, after hearing from a number of practicing physicians, recommended that the statute imposing a license tax on physicians be repealed.

Dr. C. P. Wertembaker, of the Public Health Service, now at Norfolk, declares that there are but two kinds of people who should be exempt from compulsory vaccination; those who are dead and those who have had the smallpox.

WEST VIRGINIA.

At Charleston, Dr. O. L. Aultz, city health officer, announces that small pox is now under control. During January about 350 cases were reported to the county health department and no fatality.

Dr. O. B. Lynch, formerly of Princeton, W. Va., has moved to Braiden, where he was once principal of the public schools.

At Fairmont, early in February, quite a number of well-defined cases of smallpox caused a general vaccination to be adopted. The Barnsville school was closed and revival meetings suspended. Doctors who had treated such cases and neglected to report them are severely censured.

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is the only instrument that will give you an accurate and simple means of contrasting one sound with another. Its Acoustic Rheotome exaggerates, reduces, graduates all sounds that pass through it. Regulates them with absolute accuracy. Of unquestionable value in all diagnostic examinations for the different pathological changes of the muscular system of the heart, lungs and blood vessels.

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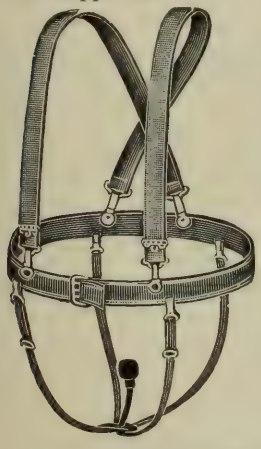

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The Brown Sphygmomanometer

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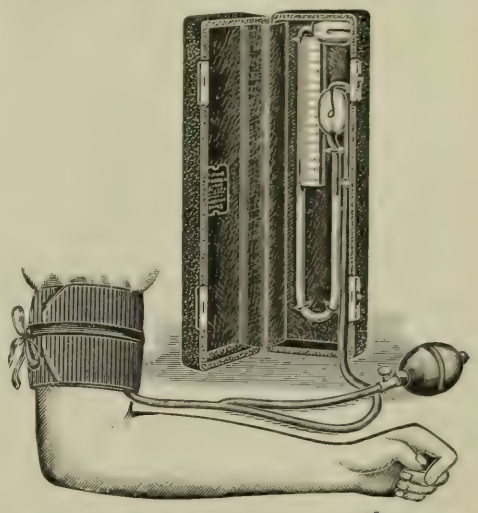

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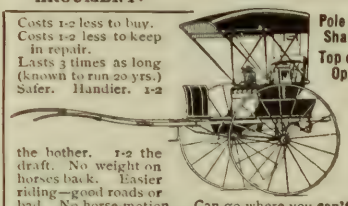

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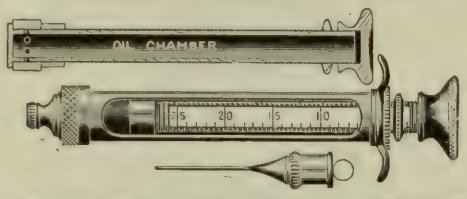

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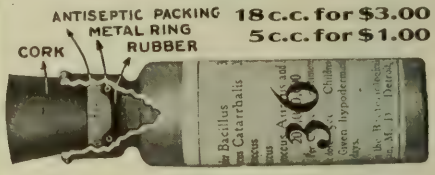

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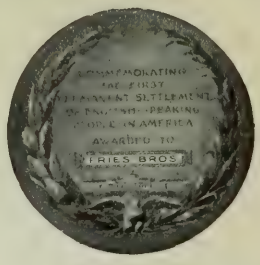
Gold  **Medal**

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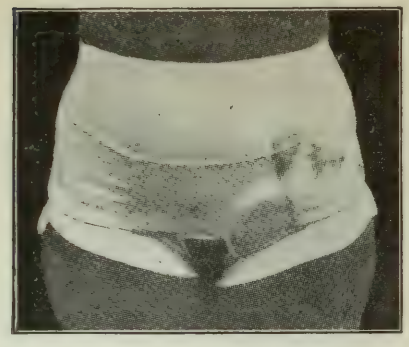

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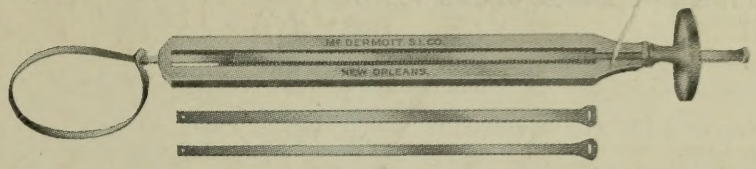

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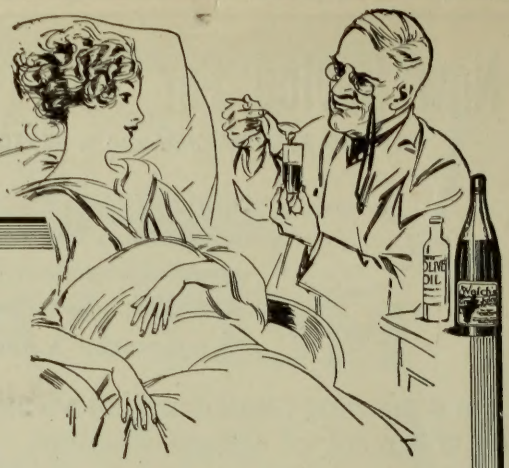

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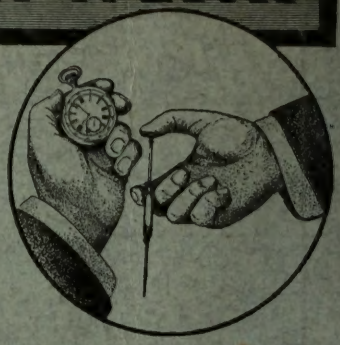
Mellin's Food

in the correction of these errors will save the physician much annoyance.

Write us and we will give you the result of our observations.

MELLIN'S FOOD COMPANY, BOSTON, MASS.

Five Seconds by the Watch



Prompt and complete solution of its components is what the physician wants—and should *demand*—in a hypodermatic tablet.

Why accept a tablet that merely flies to pieces when thrown into water?

And that is just what some hypodermatic tablets do—fine, undissolved particles settling to the bottom.

This is mere ***disintegration,*** not ***solution.***

Such tablets are worse than worthless in an emergency.

Parke, Davis & Co.'s

Hypodermatic Tablets

dissolve freely and fully, forming a clear solution, without residue.

Test one by the watch!

Drop the tablet into a syringe partly filled with lukewarm water. Shake vigorously. In five seconds (or less) it will have dissolved completely. ***Try it!***

Parke, Davis & Co.'s Hypodermatic Tablets are molded with the utmost care. They contain only ingredients that have been rigidly tested. They are true to label. They are active. They are of uniform strength.

TUBES OF 25—NOT 20.

Parke, Davis & Co.'s Hypodermatic Tablets are supplied in tubes of 25. Certain competing tablets are marketed in tubes of 20. When you specify "Parke, Davis & Co." on your orders you get 25 tablets to a tube, not 20.

Home Offices and Laboratories,
Detroit, Mich.

Parke, Davis & Co.